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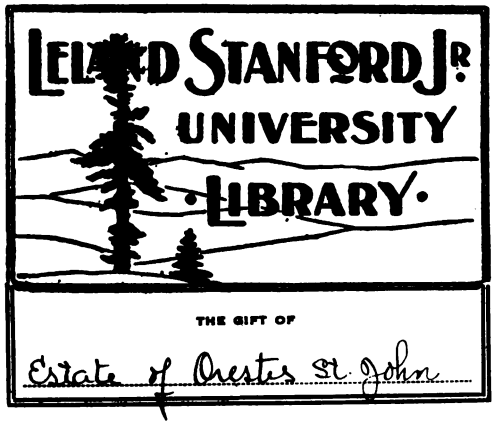
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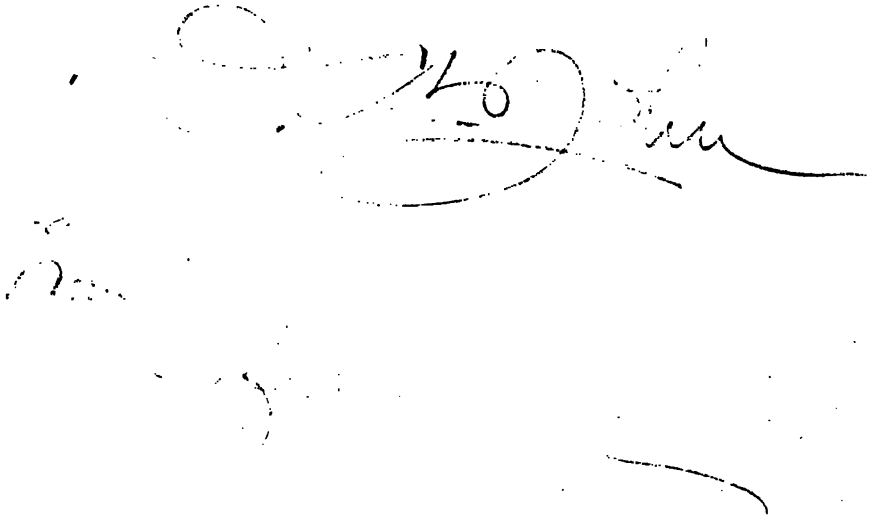

TRANSACTIONS

OF THE

KANSAS ACADEMY OF SCIENCE.

VOL. V.

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PROCEEDINGS.

The ninth annual meeting of the Kansas Academy of Science convened at Topeka on the 14th of November, 1876, and closed its session at 10 P. M. on the 15th. Previous to the more public exercises of the Academy, held in the Senate chamber of the capitol, a meeting assembled at the office of Dr. Thompson for the transaction of business. On recommendation of the committee on nominations, the officers of the past year were reëlected, viz.:

President—F. H. Snow.

Vice Presidents—B. F. Mudge and J. H. Carruth.

Treasurer—R. J. Brown.

Secretary—J. Savage.

Several changes were made in the commissions of the Academy, among which are the following: E. A. Popenoe was appointed to that of Botany, Prof. Dunbar to that of Philology, Dr. Thompson to that of Meteorology, and C. K. Jones to that of Geology. A new commission was added to the former list—that of Ethnology—and J. D. Parker and B. F. Mudge were appointed to it. A new interest has attached itself to this latter branch of study, by the discovery of a large number of mounds on the bluffs opposite Kansas City, Mo.

The following articles were added to the constitution of the Academy:

ART. VI. There shall be a meeting held during the summer months for the purpose of hearing scientific lectures of a popular character.

ART. VII. These meetings shall be known as the "popular meetings" of the Kansas Academy of Science, and shall be held in such places as may be selected at the annual meeting.

ART. VIII. Every member is expected to present some fact for the benefit of science, to be kept as a record, and to appear in the regular proceedings.

Resolved, That Leavenworth be selected as the place for the first popular meeting, to be held in June, 1877, and that H. M. Aller, W. S. Burke and James Wilson be appointed as committee on local arrangements.

Resolved, That Professors Mudge, Kedzie and Snow be appointed lecturers for that meeting.

It was further

Resolved, That a committee of three be appointed to take into consideration the need of additional room for the accommodation of the cabinet of the Society, with power to confer with the Kansas Historical Society, Topeka, and the State Board of Agriculture.

B. F. Mudge, Dr. Thompson and E. A. Popenoe were chosen upon this committee.

A resolution recommending a geological survey of the State was presented, and carried with much favor by the Academy. The products of our coal mines have already taken a position in the material prosperity of our State almost beyond computation: a careful survey of these formations would tend to fix more definitely the boundary line between our fertile coal measures and those that are barren.

Prof. C. V. Riley, of St. Louis, gave the opening lecture of the session, upon "The Locust Problem."

Prof. F. W. Bardwell, of the State University, gave the lecture of the second evening, upon "Our Neighbor the Moon."

The following papers were read before the Academy, and, as far as space will allow, are given entire:

1. On the Occurrence of the Mastodon in the Pliocene of Kansas: B. F. Mudge, Manhattan.
2. Climate vs. Brains: Prof. M. V. B. Knox, Baker University.
3. On the Recent Additions to the Flora of Kansas: Prof. J. H. Carruth, Lawrence.
4. On the Coleoptera of Kansas: Edwin A. Popenoe, Topeka.
5. On Colorado Coleoptera: Prof. F. H. Snow, State University.
6. On the Mineral Water at Iola, Kansas: Prof. Geo. E. Patrick, State University.
7. On the Habits of *Amblychila Cylindriformis:* H. A. Brous, Manhattan.
8. On Additions to the Catalogue of Kansas Mammals: Prof. M. V. B. Knox.
9. On a Meteorite found in Mitchell County, Kansas: Prof. Geo. E. Patrick.
10. On Arithmetical Methods: Prof. F. W. Bardwell, State University.
11. On the Prairie Dog in Kansas: H. A. Brous.
12. On the Appearance of an Egg-Parasite of the Rocky Mountain Locust: Prof. F. H. Snow.
13. On the Influence of Food-Selection upon the Evolution of Animal Life: A. H. Thompson, M. D., Topeka.

JOSEPH SAVAGE,
Secretary Kansas Academy of Science.

ANNUAL REPORT OF THE COMMITTEE ON GEOLOGY, FOR THE YEAR ENDING NOVEMBER 1, 1876.

BY PROF. B. F. MUDGE.

During the past year many important additions have been made to the cabinet of this department. Our cases were already filled at the beginning of the year; consequently, the new collections could not be classified and arranged as they otherwise would have been.

Many persons not members of the Academy have made donations to the cabinet, to whom the thanks of this Society are due. In some instances the names of the donors are unknown. It is desirable that the contributor's name should accompany the specimens when sent.

Your chairman has added a full suite of minerals from the lead and zinc workings in the southeastern portion of this State, and four large boxes from the cretaceous of western Kansas. These are yet unopened, for want of room on our shelves. He has the past year, as previously, been engaged the greater part of the time, with four scientific assistants, in exploring the Niobrara group of the cretaceous of Kansas, beyond the settlements, and collecting the fossil vertebrates of those deposits. This party being in the pay and interest of Yale College, all the most valuable specimens were sent to that institution. But while Yale added to its museum, we at the same time added to our knowledge of geology much that is important and valuable to us as a State. Information has thus been acquired during the past three years which will enable us to map correctly the outlines of the Cretaceous and Tertiary formations, and to substantiate scientific facts peculiar to the fossils of those ages.

Thus we have found a rare form of crinoid, which has been described in the *American Journal of Science*, vol. XII, p. 81, by G. B. Grennell, as *Uintacrinus socialis*. This was

also found in Utah by Prof. Marsh's party. It is the more worthy of note, as until quite recently, neither in Europe nor America had crinoids been discovered in the Cretaceous. We have learned, too, of the pterodactyls of America, that all thus far discovered are without teeth: a fact in strong contrast with those in other parts of the world. The jaws or beaks of the American species are longer and more slender than those hitherto known, and in the opinion of Prof. Marsh, showing indications of having been encased in a horny sheath. These features were made known in an article in the *American Journal of Science*, vol. XI, p. 507. We also procured more perfect specimens of the smaller bones of the order from the hands and feet. A few solitary bones have been placed in this cabinet. Our collections of saurians have also given us more correct knowledge of their structure. The same may be said of turtles. Fossil fish, also, are quite numerous in the territory under examination. One fact of interest in this family was the finding of the teeth, cartilaginous jaw and vertebræ of a shark, *Galeocerdo falcatus*, three portions of which, I think, have never hitherto been found together. The flat porous vertebræ had occasionally been collected, but the genus to which they belonged was unknown. Several were found some years ago and placed in our cabinet, but not classified. The teeth have long been known and described.

Fossil birds were rare and valuable findings. These were generally of the order Odontonadæ, or birds with teeth. They were of two genera; in one, the teeth being placed in sockets, like mammalia, and in the other, in grooves, like many genera of fish and reptiles. Several new species were added to science, and more perfect specimens of Hesperornis were collected the past summer than ever before. Perhaps it may not be amiss to add that birds with teeth have been found only in the United States, and one genus, the Icthyornis, only in Kansas. Thus, our fossil pterodactyls have no teeth, and our birds have, in direct contrast with those found in other parts of the world.

We confess, in closing, that the great pleasure of our employment in thus unfolding the geological wealth of Kansas, is mingled with regret that these valuable specimens, amounting to some six or eight tons, have gone out of the State to enrich an institution already possessing one of the best collections in the world, while our own cabinets, private and institutional, are yet meager in these vertebrate remains, and perfect specimens of which no future explorer can hope to procure by going over the same grounds.

CLIMATE AND BRAINS.

BY M. V. B. KNOX.

"The general aspects of nature, the climate, and the scenery," says B. F. Cocker, "exert an appreciable and acknowledged influence on the mental characteristics of a people." Mitchell says: "A hot climate and a bounteous soil, where but little labor is needed to procure the necessaries of life, tend to enervate the body and mind; but a temperate clime, where the hand and head must be constantly at work, is favorable at once to physical, intellectual and moral development." "With the tropical man," says Guyot, "the life of the body overmasters that of the soul; the physical instincts of our natures those of the higher faculties; passion, sentiment, imagination predominate over intellect and reason; the physical faculties over the active faculties. In the temperate climates, all is activity, movement. Here physical nature is not a tyrant, but a useful helper; the active faculties, the understanding and reason, rule over the instincts and the passive faculties; the soul over the body. In the frozen regions, man contends with

a niggardly and severe nature. It is a desperate struggle for life. No higher culture is possible under such unfavorable conditions."

The student of history can at once see the truth of these statements. No nation great in moral and intellectual development exists or ever has existed in a purely tropical or frigid climate.

The discussion in this paper will seek the relation between climate and brain-power and products, and this ultimately with reference to Kansas.

Herschell defines the climate of a country as the result of all the meteorological influences to which it is habitually subjected. "Climate," says Humboldt, "indicates all the changes of the atmosphere which sensibly affect our organs, as temperature, humidity, variations in barometrical pressure, the calm state of the air, or the action of opposite winds; the amount of electrical tension, the purity of the atmosphere, or its admixture with more or less noxious, gaseous exhalations; and finally, the degree of ordinary transparency and clearness of the sky, which is not only important with respect to the increased radiation from the earth, the organic development of plants, and the ripening fruits, but also with reference to its influence on the feelings and mental conditions of man."

Brain-power may mean that activity of the mind which shows itself in various great productions, as literature, art, architecture, conquest, or civilization. Any one of these marks great intellectual power, though some more than others. A statue, a temple, or a campaign, may, in its conception and finish, be a poem; but above Phidias, Cheops and Alexander, tower Homer, Shakspeare and Milton. Products of pure mind justly rank above those in which the conception is carried out only by vast physical aid. The writings left by the Greeks are worth more to us than their sculpture and temples. It is interesting to trace the gradual change in brain-products from very ancient times to later, and see that they not only change from the gross to the finer, but the locality of them is from warmer climates to colder. This will be seen by glancing at some of the most noticeable instances.

Egypt, with its very ancient civilization, in a mean temperature of about 72° Fah., principally gave expression to its brain-activity in gigantic pyramids, huge sculpture, massive temples, Sesostris-like conquests, and the elements only of the arts and sciences. The climate seems to have been too warm for great mental activity and acumen, though the extremely dry atmosphere gave the ancient Egyptians advantages in this respect superior to many of their neighbors. When they no longer had princes able to lead to conquest, or to build vast pyramids, the ease with which they could procure a living from their rich valley allowed them to fall into habits of indolence and into enervation.

India, in similar temperature, but with damper air, later produced the fantastic civilization of the Ganges and Punjaub; the light, airy architecture, imaginative and sensual in its nature; the weird Vedas, with their glimpses of the true God, but impossible systems of cosmogony, deities, and worship. Regarded simply as a brain-product, the Vedas are greatly superior to the Egyptian Book of the Dead. But the variations of climate in India are greater than in Egypt, if we take the extended definition of climate given by Humboldt. It will be noticed that reference is made to the influence of climate, only, on the intellectual powers, it not being the design to involve the peculiarities arising from race, the extraneous influences of national relations, or the manifest destiny of nations. God is in history, but not to the total exclusion of many surrounding influences.

Passing from these hot latitudes, let us glance at the climate and intellectual force of the Greeks. Instead of a temperature ranging from 72° to 75° Fah., it averages ten degrees less; a country not of broad plains and great rivers, but one of narrow vales, short, rapid streams, indented sea-coasts, beetling cliffs and snow-capped mountains. Here were clear skies, equable temperature, variety of productions, a soil not so rich as to breed habits of indolence, alternating sea breezes and bracing mountain air, all combining with

nobleness of race and high destiny, to place the Greek people where it could achieve prodigies of brain-product. How nobly it did this is shown by advanced civilization, arts, laws; its unrivaled architecture and statuary; its grand literature of poems, history and philosophy. But an imaginative, sensual element enters into every Greek production.

In Italy the climate is even nearer perfection. "Varro preferred the climate of Italy to that of Greece, as producing in perfection everything good for the use of man." If it lacks the grand, rugged mountain scenery of Switzerland, it has enough mountains to give great variety, with wildly romantic valleys between them. On all sides the sea reflects the sun's bright rays; now sea breezes, now mountain zephyrs dally with the luxuriant foliage of the oak, chestnut, mulberry and vine. Here brain-products were on a vaster scale, with more patience in working them out, broader culture, especially in law and general knowledge. But when in the Roman Senate there was no longer the cry of Cato that Carthage must be destroyed, when wealth and luxury and possibility of ease did their deadly work on the Roman character, the climate, too warm and humid to drive or invite to hard mental labor, allowed the scepter to depart from Italy, and now it is upheld by a sturdier race in a colder climate.

France may next claim attention. Here the climate is a little colder than in Italy, ranging from 60° in the south to 50° in the north. Zones of olive, maize, vine, small grains, succeed each other. The climate is modified by proximity to the sea and to mountain ranges. From the various climatic influences, genial and sunny, there could be expected a literature sparkling and vivacious, and such the French have produced. In other things beside literature, similar results have arisen from brain-power. The names of Rousseau, Voltaire, Racine, Moliere, De Staël, Lamartine, suggest graceful, racy, but not profound productions. Doubtless France has passed the zenith of her glory in brain-products.

To find the peoples who are most prolific in brain-work, it is necessary to go to colder and more northern climates. Justly, Great Britain and Germany can lay claim to pre-eminence. England, near the center of the temperate zone, is, by its insular position, never subjected to extreme climatic changes, and grows food eminently fitted to produce a robust physique—not food so much to pamper the appetite as to satisfy the demands of a rigorous climate. The names of such men as Spenser, Milton, Shakspeare and Gibbon will ever be abundant proof of England's intellectual grandeur. In one corner of Great Britain lies plucky little Scotland, "where to a late period a scanty population rescued itself from want or barbarism by determined and intelligent industry." Scotland has given to the world James Watts, Burns, Hume, Scott, Macaulay, Livingstone and Carlyle. It is generally recognized, even by Englishmen, that she produces a superior race of men; and to what is this fact due more than to her cold bracing mountain air and severe climate?

In Germany, now the acknowledged store-house of ideas, producing more and better brain results, possibly, than all the rest of the world, the climate is cold and exacting. The temperature is eight or ten degrees lower than in France, and equal to that of Scotland. The Vosges and Hartz mountains, with their spurs, make Germany a country of mountain air. The climate is more continental than in Great Britain, which is possibly an advantage to brain-workers. Here Luther, Richter, Göthe, and Schiller lived and wrote; and their peers are toiling on to-day, finding the cool, bracing climate a most vigorous energizer to hard work. The productions are not so spontaneous as to beget indolence, and reaction of the human system against the cold sets the powers of the mind into vigorous action. Not alone to her climate does Germany owe her wonderful brain-products, unrivaled in time, but largely to it. These northern nations, France, Great Britain, and Germany, present mental results that are less fanciful than those of the ancients. Facts are reached by the inductive method; a purer philosophy and nobler religion are

believed in; imagination is rich and varied, but not wild and sensual; patient and extended research mark the labors of the plodding brain-workers of Western Europe.

In America the influences of climate are plain to all. Of one race, the settlers of Jamestown and Plymouth began their work; but if the New Englanders had to contend with greater privations and a colder climate, they were repaid for it by largely giving thought to the nation. New England principles and ideas are not mere expressions—they are freighted with meaning. Are the incompatible characteristics of the two sections of our country traceable so much to anything else as to influences of climate? Slavery was once in Massachusetts as well as in South Carolina. The climate and productions; the sense of right, born of a vigorous conscience and healthy brain; the predominance of reason and intellect over the imagination and passions, as Guyot explains—all, no doubt, had to do with this difference. In the North, man's character and activities, under the grayer skies and severer climate, are more in his control; while the fiery Southron is impatient at the Northerner's slowness. But American literature, as such, has almost all grown up north of 55° Fah., which is near Mason and Dixon's Line. Edwards, Webster, Bancroft, Prescott, Motley, Irving, Emerson, Hawthorne, Whittier, Longfellow—names to live as long as America lives—are all Northern men, and have few compeers in the warmer, enervating Southern States.

After these reviews, the question naturally arises, What of Kansas? Will her climate probably be productive of brain creations or not? The mean temperature at Lawrence, for eight years, has been 52.82° Fah. Somewhat warmer than New England and Scotland, those centers of mental activity; the former being at Boston 47, and at Edinburgh 46° Fah. It is almost exactly the temperature of Berlin, the center of German activity, and of London, the center of English activity. The extreme heat of the summer is almost continually relieved by breezes, but for which vigorous mental and physical activity would be at times almost totally cut off. As it is, more or less enervation is felt by people from a cooler climate. It is feared by many that this is leading to habits of indolence, especially in the influence of three or four summer months. Yet to say, in face of the vast crops and general improvements, both private and public, that the people of Kansas are much given to indolence, would be folly. It may be feared, however, that keenness of mental energy is somewhat dulled by the heat. To be productive in brain-work, not only is keen energy demanded, but impassionate patience. The production of a single book has often cost long years of continuous work. Will Kansas climate invite to such patient plodding?

Possibly another cause for fear is the ease with which simply a living is gained. Not nearly as much toil, care and economy are called for here to gain a living as in New England. History shows that when a people can easily get a competency, or wallow in wealth, degeneracy of mind follows. Note the commencement of degeneracy in Egypt, Persia and Rome. No age in English literature has equaled that of Elizabeth. Yet Englishmen had to work much harder then than now. Will lack of necessity for hard toil be a bar to mental creation in our State? Thinking of these things, I have wished that some superfluous spurs from the Rocky Mountains were set down in the middle of Kansas. When we think of the hectic literature growing up among the foot-hills of the Himalayas, the Ghauts and the Zendavesta in the eastern highlands of Persia, the Hebrew scripture in the hill-country of Palestine, of Greek and Latin classics among the mountains of Greece and the Apennines, the literature of France, Great Britain and Germany, in countries, many parts of which are broken with high hills and rugged mountains, of New England, New York and Ohio, all of them hilly and mountainous, we can sigh for the subtle something hanging above these mountains—the bracing air, the intoxication of their fresh breezes, or varied scenery, that some way has given birth, has shaped and vivified the best brain and heart productions for four thousand years.

Yet there is a quiet, luxuriant beauty to our landscapes of extended prairie, wooded streams and bluffs, that may partially replace the lack of mountain scenery.

It has been suggested by Prof. F. H. Snow, that the general dryness of the atmosphere in Kansas may prove favorable to brain-workers. It is a well-known fact that one is languid, and persistent work is repugnant to him, when the air is more than usually humid. The amount of ozone is greater here than in Michigan, and possibly in other States, as shown by Prof. Kedzie's paper on Ozone, in this Academy. Quite probably, this element will prove conducive to a great mental activity. Those familiar with the history of literature, will remember that when men are settling a country there is little chance for pure mental products. With other things, their minds are absorbed in organizing, building, shaping. Thought is like carbon: to crystalize into the diamond it needs time, and the most favorable of surrounding influences. Yet the very fusion of so many diverse characteristics of blood, locality and nationality, may yet place Kansas mental products in an enviable place. Give us time, and Kansas may be the Athens of America.

The attention paid to the machinery of mental development here is praiseworthy. School-houses and colleges have sprung up on every side, and newspapers have multiplied. Of the latter, in 1874, there were more than one hundred and fifty. No doubt, any one familiar with Eastern education is grieved at the lack of thoroughness in our public schools. As the students are passed up into the colleges, this lack is often painfully apparent. Why? Does the climate beget habits of mental laziness? Possibly, however, it is owing to the lack of time for the crystalization of the system. We must not be deceived by the *number* of schools and colleges: the work accomplished in them is the true test of mental capabilities. There is lack, too, in the number of students attending the various colleges of the State. As near as I can reach number, in eleven State and denominational colleges in 1874, there were, including preparatory and collegiate departments, only about fourteen hundred students, by far the greater number of these in the lower grades of preparatory. It is found difficult to induce students to take extended classical or scientific drill. In closing this paper, I am glad to quote the opinion on this subject of a teacher known to you all, Dr. Marvin: "I had almost reached the conclusion that in Kansas we had struck the golden mean. The students with whom I had to do in Allegheny College were better drilled in the elements of education than most who come to us here. Our students certainly show a mental vigor, as a body, equal to any with whom I have met, in an experience of twenty-nine years of seminary and college labor. The students, as I knew them in Keeseville Academy, Clinton county, New York, were quite as lively at ball, especially foot-ball, but not better in algebra. This is as I seem to see them in 1839. I doubt whether we yet have age and solidity enough in society here, to determine scientifically the merits and demerits of our climate or brain ability."

BALDWIN CITY, KANSAS, November, 1876.

BISON LATIFRONS IN KANSAS.

BY B. F. MUDGE.

In his monograph on the American bison, Prof. J. A. Allen has given a description of two species of extinct buffalo, viz.: *B. latifrons* and *B. antiquus.* Of these, the former is the largest, the rarest, and the most remarkable. No entire or half skeleton exists, and it has been found in four only of the United States. Even single bones are rare. It therefore becomes of interest to preserve every fragment of this gigantic animal. A few

months ago, a horn-core of *B. latifrons* was fished from the bed of the Big Blue river, a few miles from Manhattan, Kas. We give its measurements as follows, viz.:

Length on the convex side	31 inches.
Length on the chord of the arc	22 "
Circumference 3 inches from the base	16½ "
Circumference 10 inches from the base	13 "
Circumference 14 inches from the base	12 "
Circumference 24 inches from the base	8½ "

Comparing these measurements with those given by Prof. Allen, we find our Kansas specimen a little shorter, more slender, and more curved than his. This would indicate the Kansas horn-core to be from a female. About an inch had been broken from the tip. If we restore this, and add the horn—which was rather slender—and the breadth of skull, we shall find that the distance from tip to tip will be over nine feet. The weight of *B. latifrons* was about four times that of the living buffalo. One other specimen has been found in Texas. As yet, these two are the only specimens of *B. latifrons* that have been discovered between the Mississippi river and the Rocky mountains.

HABITS OF THE PRAIRIE DOGS.

BY H. A. BROUS.

Prairie dogs have been the subject of many wild speculations. Much has been given to the public as facts concerning these interesting animals that is purely imaginative. Each of the several species have habits nearly identical, modified by the country in which they live. These animals are widely distributed over the western Territories, extending from Texas to Minnesota. For the last four years we have studied their habits, and the following are most noticeable. They are quite prolific, bringing forth from four to six at each season. The young are first observed early in May, and continue to appear throughout the month. They grow very rapidly, the pairing season being early in the fall. Until the following spring the young remain with the old dogs. Their holes are peculiarly constructed. For a few feet only the inclination is very great. That these holes communicate with others is obvious. When water is poured into one hole, the dog is often driven out of the entrance of its neighbor's house, some distance off. The amount of water that has been emptied into a single hole would go to disprove the non-communication, save above ground, with its neighbor. That the holes always communicate by subterranean passages, is not to be insisted on. Where the village is scattered, the greater would be the isolation. Naturally in a crowded town the dogs would have free and convenient passages below as above ground. Whenever their holes are in any way disturbed, the dogs repair the damages as speedily as possible. Early after a rain, as before, the villagers closely inspect their homes, to see that all is in proper shape, carefully arranging anything that is amiss. Banks surrounding the holes are kept higher than the surface of the ground, in order that the water may be prevented from filling the holes. In case of a leak, they will sometimes go out during a storm and repair the break. Tall weeds, grass, or anything growing on the "town site," that is apt in any way to obstruct their view, are cut down many times in the season, and left scattered quite thickly over the lots.

What is strangest of all is to see an owl wisely standing at a dog-hole, ducking its body as you attempt to approach. No less surprising is it to hear the startling warning from a large rattlesnake, and see it crawl safely into a hole beyond your reach. Dogs suffer more from the snakes than from the owls. The latter seek old abandoned holes, where they may take shelter and rear their brood. The darkest and deepest are not

sought by the owl. They are contented to find a retreat near the surface of the ground. That owls prey on the young dogs is not to be doubted. While very young the dogs do not venture far from their mother, remaining in the holes during the night, while the owls are most active. In body these birds are smaller than quails. The old dogs are seldom attacked by the owls, and seemingly pay little attention to them after their young are old enough to shift for themselves. In the rattlesnake they find an enemy not so readily treated. No hole is secure: day and night the dogs are harassed by this, their worst and deadliest foe. Deep holes are retreats admirably adapted to the wants of the rattlesnake during the long winter months, where he finds a dry bed already prepared, and palatable meals furnished by the young, tender dogs. Thus the old dogs are subjected to great inconvenience, and, in an encounter, though they may drive the intruder from their holes, are sure to be left in a dying condition. More than once, after seeing a snake enter a prairie dog's hole, have I heard a struggle away down near the bottom. Often the dog is driven out, and dies of its poisonous wounds, or, after the snake has left, it succumbs, to be at last carried from its home by the remaining members. (The dogs carry off all effete matter.)

Sometimes, should the snakes venture into a hole where the occupants have been able to make good their escape, they may be conquered. The dogs seem to hold a sort of council for a few minutes, and then commence filling up the hole he entered. In this way they very soon completely bury the snake alive, without subjecting themselves to any danger. During this operation the snake keeps up a constant threatening.

No animal has been able to do without water for any protracted period. Now, are we to suppose that prairie dogs are exceptions? While in a cage they partake of water freely, and when it is withheld for any length of time, they become languid and die. May we not conclude that in their prairie towns they have an underground passage to water? The country on which the villages are usually located does not in any way go to disprove it. Geologically, the idea and evidence strongly aid. Rain is too uncertain, and in most cases is brief and long deferred; so that to suppose an animal could endure the protracted drouth, where dews are very light or wanting, is decidedly improbable, to say the least. If not by such wells, when surface-water is miles from the villages, in what other way can water be obtained?

HABITS OF AMBLYCHILA CYLINDRIFORMIS.

BY H. A. BROUS.

DESCRIPTION.

A. cylindriformis, Say. Color, pitchy black; elytra often brownish. Labrum with two obtuse teeth at middle. Head as large as the thorax; smooth. Eyes small. Thorax subcordate, margin not prominent, surface smooth, impunctured, subapical transverse impression faint. Elytra oblong, nearly twice as long as wide, humeri broadly rounded, sides feebly arcuate, apex suddenly declivous, surface coarsely but not densely punctured, and with two indistinct rows of larger punctures and three fine carinæ on each side, the outer and inner extending to three-fourths, the intermediate slightly longer. Body beneath nearly smooth. Length, 1.20–1.25 inches.

Male—Hind trochanter acute and grooved. *Female*—Hind trochanter shorter, obtuse and smooth.

This beetle, usually considered very rare, is, I am satisfied, much more common than heretofore supposed. I base this opinion on my own observations, and have a good col-

lection to sustain it. Their peculiar habits are evidently the great cause of their rarity, and once understood, I am positive they will become quite common. Their geographical distribution is, so far as is now known, rather limited; yet there is now no reason to suppose that they will not, eventually, be found extending over a large portion of Kansas, Colorado, northern Arkansas, and Arizona.

The following is what I have learned concerning them: Nocturnal (crepuscular), rarely being taken until after sunset, and occasionally in the morning. Found usually along clay banks, living in holes generally made by themselves, where they find that seclusion so congenial to their nature. The state of the weather affects appreciably this insect. When cold and blustery, they remain concealed, preferring a warm, balmy air; occasionally, *a warm, cloudy afternoon* will entice them from their retreats, but this is rarely to be expected. Like the rest of *Cicindelidæ*, they are predaceous. They also feed on effete matter. In many of their habits they are like *Asida*.

THE WACONDA METEORITE.

BY PROF. G. E. PATRICK.

Some few weeks ago, a stone of about thirteen pounds weight was placed in my hands by Prof. J. S. Shearer, of the University, with a statement that it was a fragment of a much larger rock, found at Waconda, Mitchell county, and with the request that I should examine into its composition and nature. This I proceeded at once to do, and a very brief examination convinced me that I had in hand a fragment of an *aerolite* (*air-stone*, literally), or stony meteorite; this term being included, together with two others, *aero-siderite* and *aero-siderolite*, under the class title, *meteorite*.* Its fractured surface, laid bare in breaking it from the original mass, is of a light gray color, showing numerous small particles of nickeliferous iron, and occasionally a nodule of troilite (meteoric sulphide of iron, Fe S.)

Its original surface (for the fragment under examination happened to be an outside piece of the original stone) shows the characteristic black crust, the result of superficial fusion. No free carbon could be detected. A small piece of the stone placed in water, under the receiver of an air-pump, evolved gas quite copiously upon exhaustion; the character of this gas was not studied, but it is undoubtedly composed largely of hydrogen.

An average fragment of the size of a hen's egg was taken for the determination of specific gravity. The precaution advised by Prof. J. L. Smith was observed, namely, that of freeing the stone of inclosed gases before weighing in water, by placing it, immersed in water, under the receiver of an air-pump, and exhausting. The specific gravity thus obtained was 3.49. Next the percentage amount of the nickeliferous iron was determined by repeated extractions from the finely-powdered stone with a magnet, the magnetic portion being in turn repeatedly powdered and reëxhausted with the magnet. 183.550 grammes of the stone treated in this way yielded 16.950 grammes; that is, 9.23 per cent. of nickeliferous iron, freed from impurities as perfectly as was pos-

*In dividing meteorites into these three groups, the distinguishing feature lies in the relative amounts, and arrangement of the iron and stony material (silicates), which they contain. All contain native iron, which, by the way, is *almost* invariably associated with nickel and cobalt. An *aerolite* is a meteorite composed chiefly of stony material, but containing nodules of nickeliferous iron distributed through its mass. An *aero-siderite* is one whose bulk is composed of solid nickeliferous iron, with little or no stony matter adhering. And the *aero-siderolite* is an intermediate variety, of very rare occurrence, in which the iron, forming a skeleton, is honey-combed in every direction by the stony portion.

sible by physical means. This iron was malleable even when cold, very tough, and of bright metallic luster. A portion of it was subjected to analysis, and yielded the following results:

Sulphide of iron	A trace, undetermined.
Iron	90.47
Nickel	7.81
Cobalt	1.72
	100.00

Of the history of the stone little is known. For the few facts I have been able to obtain concerning it, I am indebted to its possessor, Dr. Geo. W. Chapman, of Waconda. The weight of the stone when secured by him, in 1873, was about 120 pounds.* Several persons remember to have seen it in the same locality as early as 1870, at the time of the first settlement of the town, but at that time it attracted no special attention. Dr. Chapman also informs me of a fact of which I was ignorant until after my examination was completed, namely, that the stone had been recognized as a meteorite by Prof. C. U. Shepard, Sr., and also by Prof. J. L. Smith, each of whom had obtained a specimen of it.

THE IOLA GAS WELL.

BY PROF. G. E. PATRICK.

A recent visit to the locality, and a chemical examination of the water, enable me to present a few facts concerning the very interesting natural phenomenon which forms the subject of this paper.

The Iola gas well or mineral well is situated at Iola, Allen county, Kansas, on the line of the Leavenworth, Lawrence & Galveston Railroad. It was sunk in the early part of 1873, not as a well, but as a boring for coal, the occurrence of which as an underlying deposit of that section of country was thought quite probable, though not at all certain, by those best versed in Kansas geology.

A cylindrical diamond drill was employed; and the core taken out, representing the numerous and varied strata passed through, forms an interesting stratigraphical study. The drill was put down 400 feet, and no coal-bed of paying thickness was reached; still the pluck of the managers survived, and with exceptional perseverance they went down without encouragement over 200 feet further. But at a depth of 626 feet they met with a novel change; at that depth the drill suddenly dropped into and through a cavity of about 20 inches in thickness, and water and gas began to be forced up around the drill.

But the object of the boring being neither water nor gas, but coal, with almost unprecedented perseverance the company put their drill down still another hundred feet, but without success; and at a depth of 736 feet gave it up as a lost cause.

The flow of water and gas that commenced at a depth of 626 feet, has continued ever since, and it is a fact worthy of notice that the velocity of the flow has materially increased since that time, the increase being estimated by competent judges as at least 100 per cent.

Soon after the completion of the well, Prof. Stimpson, then of the State University, from measurements made on the spot, estimated the discharge of gas to be about 5,200 cubic feet per day; but from its greatly increased velocity, its daily discharge is now estimated at nearly or quite 10,000 cubic feet. Of water the yield is said to be now about 95 barrels daily.

The velocity of efflux, both of water and of gas, is not at all constant; for the flow is by intermittent pulsations, as must necessarily be the case in such a well. It is not an arte-

*That I infer was its original weight when it fell; but of this I am not certain.

sian well in any sense, as the motive power is without doubt the elasticity of the gas that is being constantly generated, or (not to exclude a possible, though I think not a probable explanation) that has been generated and stored up in past times.

This question of the time of the gas generation, whether past or present, cannot, it is true, be answered with entire confidence, but in view of the long time the flow has continued with undiminished force, I think it more probable that through the agency of internal heat—or perhaps by slow oxidation—vegetable organic matters (common bituminous coals, perhaps) are being to-day decomposed into this light gas and other less volatile compounds. But at what depth in the earth, or how many hundreds of miles away from the Iola well this process is going on, I will not venture even an opinion.

Another point still more theoretical: it seems very probable to me that the cavity found under Iola, from which water and gas are ejected, is of great lateral extent; that it was once occupied by a coal-bed, and that this coal has, as explained above, furnished the gas. The decomposing agency, heat, must then (according to this theory) have acted with considerable energy at a depth of 626 feet below the present surface of the country at Iola. But there is no evidence of extraordinary heat at this locality now; hence, to make the theory consistent with itself, we must assume that the heated area has not been permanent in position but has moved about—an assumption which I think geological science will allow.

To return now from the theoretical unknown to the actual known. The intervals of quiet between the pulsations are of course while water is accumulating in the well, and before the gas has acquired sufficient tension to hurl it out. These intervals I found to be of from 30 to 40 seconds duration; but the proprietor of the well, Mr. Acers, informed me that the duration of the interval is not at all constant, but that at night and before a storm it is shorter, and that the energy of the pulsation is then considerably increased.*

From its quality the gas is better fitted for heating than illuminating purposes, the flame yielded by it being decidedly thin, from its poverty in carbon. But if properly carbonized by passing through gasoline, it would undoubtedly become a very superior illuminating gas. As yet it has not been utilized to any extent.

I have been unable as yet, from lack of time, to examine into the composition of the gas, but hope to do so before long.

Now to turn to the water. It has had attributed to it, upon grounds which I need not here mention, rather marvelous medicinal properties; and now, whatever its virtues may be, it is sold and drunk in large quantities.

The question of its value as a curative agent I do not propose to discuss—that is left with the doctors and the people—but only to give a report of its mineral constituents, and let others decide whether they are medicinal or not. The total solid residue upon evaporation is 16.504 grammes per litre of the water. The ingredients and proportions are as follows. The carbonates of the residue are present in the water as bicarbonates: †

	Grammes in 1 litre of water.
Sodium Chloride, Na Cl. (Plus K Cl. small amount)	15.010
Calcium Chloride, $Ca Cl_2$	.543
Magnesium Chloride, $Mg Cl_2$	.624
Ferrous Carbonate, $Fe CO_3$	.023
Calcium Carbonate, $Ca CO_3$	.272
Sodium Sulphate, $Na_2 SO_4$	.019
Sodium Bromide, Na Br	.004
Silica, $Si O_2$ (possibly combined with Na)	.009
Total solids	16.504

*It is suggested that this phenomenon is caused by the variation in atmospheric pressure. Other similar instances have been reported.

†Because the metric system of weights and measures is used in preference to all others in science, and more especially because it should be used in this country as well as in all others for commercial purposes, I use it here. These figures are of course easily convertible into terms of grains to the gallon, remembering that 1 gramme = 15.4323 grains; and that 1 litre = 1.05672 quarts, U. S.

The water also holds in solution a small amount of the hydrocarbon gas (together with carbonic oxide, oxygen and nitrogen), but this seems not to decompose at all during evaporation, as it does not contaminate the solid residue.

The temperature of the water as it issues from the well is constant throughout the year, and is about 61° Fah.

LIST OF COLEOPTERA

Collected in Colorado in June, July and August, 1876, by the Kansas University Scientific Expedition.

BY PROF. F. H. SNOW.

Five members of the class of 1876 of the University of Kansas, after commencement, organized a scientific expedition for explorations in Colorado, and invited me to accompany them. The names of the students were as follows: George F. Gaumer, Charles W. Smith, Elmer B. Tucker, Miss May Richardson and Miss Lizzie Williams. My wife and son were also members of the party. Large collections were made of insects, plants, birds, mammals and reptiles, the chief attention being devoted to the first two of these departments. A few minerals were also collected. Three weeks were spent at Colorado Springs, from which point excursions were made to the Plains on the east, to the summit of Pike's Peak, Chiann Cañon, and various other localities. Three weeks were devoted to an expedition to the South Park by way of the Ute Pass. During the first week in August the students returned home, but the rest of the party remained in camp in Engelmann's Cañon, along the trail to Pike's Peak, until September 1st, making large collections of insects.

Of the material thus accumulated, I have as yet had time to "work up" only a single order of insects, the Coleoptera. In this order three hundred and four species and twelve varieties were collected; among them twelve new species, and one of Thomas Say's "long-lost" species (*Dictyoptera sanguinipennis*). The list includes a few species taken by Mr. Edwin A. Popenoe, of Topeka, who spent two weeks in Colorado, and was with us for a single day at Colorado Springs.

For the determination of a large proportion of the species not previously in my collection, I am indebted to Dr. John L. LeConte, of Philadelphia, who will describe the new species discovered by our party. The number prefixed to the names are those of Crotch's "check-list." Instead of using the word "rare" to denote infrequent occurrence of a species, I have preferred to mention the exact number of specimens in each case obtained.

LIST.

CICINDELIDÆ.

1. Amblychila cylindriformis, *Say*. A single specimen was found dead in a spider's web, in Webster Park, by Mr. Popenoe. The rarity and value of this insect may be inferred from the fact that $12 are asked for a single specimen by Eastern dealers.

12. Cicindela longilabris, *Say* var. South Park, sandy plains, common; differs somewhat from the type-form.

22. Cicindela purpurea, *Oliv.* var. Audubonii, *Lec* South Park; same localities as the preceding.

23. Cicindela cimarrona, *Lec.* South Park, with the preceding. A large series of the last two forms was taken, convincing Dr. LeConte of what he had long suspected, that they should not be considered distinct species.

25. Cicindela venusta, *Lec.* A single specimen only, on the plains near Colorado Springs.

27. Cicindela fulgida, *Say*. Banks of the Platte, in South Park; only five specimens.

28. Cicindela tranquebarica, *Hb.* var. Two specimens.

30. Cicindela 12-guttata, *Dej.* Abundant at Manitou and vicinity.

30*b*. Cicindela guttifera, *Lec.* Same localities as the preceding.

37. Cicindela cinctipennis, *Lec.* Only five specimens; locality not noted.

51. Cicindela punctulata, *Fab.* Abundant everywhere.

51*a*. Cicindela micans, *Fab.* A green variety of the preceding; not uncommon.

CARABIDÆ.

84. Elaphrus Californicus, *Mann.* One specimen only, at Manitou.

173. Cychrus elevatus, *Fab.* Two specimens only, taken in our tent at Engelmann's Cañon.

200. Pasimachus elongatus, *Lec.* Found abundantly under cattle "chips," near Colorado Springs.

340. Loxopeza grandis, *Hentz.*

344. Loxopeza atriceps, *Lec.*

394. Glycia purpurea, *Say.* Of each of the last three species, a single specimen only was obtained; locality not noted.

397. Cymindis laticollis, *Say.* South Park; not common.

398. Cymindis brevipennis, *Zimm.* South Park; abundant under "chips."

399. Cymindis abstrusa, *Lec.* Found with the preceding species, and now considered identical with it by Dr. LeConte.

428. Calathus ingratus, *Dej.* Three specimens.

436. Calathus dubius, *Lec.* Five specimens.

511. Platynus cupreus, *Dej.* Two specimens.

514. Platynus placidus, *Say.* Two specimens.

520. Platynus obsoletus, *Say.* One specimen.

563. Evarthrus incisus, *Lec.* Abundant under "chips," near Colorado Springs.

581. Pterostichus protractus, *Lec.* Three specimens.

— Pterostichus longulus, *Lec.* One specimen.

679. Amara hyperborea, *Dej.* Three specimens, found a short distance below the summit of Pike's Peak, 14,000 feet above the sea. This species is also found on the summit of Mt. Washington, in New Hampshire.

694. Amara impuncticollis, *Say.* Five specimens.

— Amara sp. An undescribed species, not uncommon.

699. Amara fallax, *Lec.* Abundant under "chips" near Colorado Springs.

706. Amara interstitialis, *Dej.* Two specimens.

712. Amara chalcea, *Dej.* One specimen.

717. Amara gibba, *Lec.* Common under "chips."

815. Nothopus zabroides, *Lec.* Ten specimens.

818. Cratacanthus dubius, *Beauv.* Two specimens.

819. Piosoma setosum, *Lec.* Taken at Alpine by Mr. Popenoe.

834. Discoderus parallelus, *Hald.* One specimen.

872. Xestonotus lugubris, *Dej.* Five specimens.

925. Harpalus retractus, *Lec.* Two specimens.

926. Harpalus amputatus, *Say.* One specimen.

936. Harpalus spadiceus, *Dej.* Three specimens.

939. Harpalus pleuriticus, *Kirby.* One specimen.

945. Harpalus ellipsis, *Lec.* One specimen.

956. Harpalus oblitus, *Lec.* Eight specimens.

961. Harpalus basilaris, *Kirby.* Eight specimens.

— Harpulus n. sp. One specimen.

1033. Bembidium bifossulatum, *Lec.* Abundant in moist places on the plains east of Colorado Springs.

1055. Bembidium Nebraskense, *Lec.* One specimen.

1067. Bembidium lucidum, *Lec.* One specimen.

1080. Bembidium cordatum, *Lec.* Not common, in same localities with 1033.

— Bembidium sp. Two new species, each represented by a single specimen.

DYTISCIDÆ.

1255. Hydroporus tristis, *Payk.* Taken abundantly in the Ute Pass from the water below Bridal Veil Falls.

1317. Rhantus binotatus, *Harr.* One specimen.

1334. Ilybius biguttulus, *Germ.* Abundant below Bridal Veil Falls.

— Gaurodytes sp. An undetermined species, one specimen.

1381. Anisomera cordata, *Lec.* Seven specimens.

STAPHYLINIDÆ.

1656. Atemeles cavus, *Lec.* Taken at Pueblo by Mr. Popenoe.

1771. Creophilus villosus, *Grav.* Common.

— Philonthus sp. An undetermined species, one specimen.

1961. Oxyporous (near) 5-maculatus, *Lec.* Two specimens.

— Anthobium sp. A single specimen, provisionally referred to this genus.

SILPHIDÆ.

2178*a*. Necrophorus Hectate, *Bland.* One specimen.

— Necrophorus Hectate var. Several specimens.

2185. Necrophorus tomentosus, *Web.* Several specimens.

2188. Peltis lapponica, *Hb.* Abundant everywhere.

2195. Peltis ramosa, *Say.* One specimen.

DERMESTIDÆ.

2392. Dermestes marmoratus, *Say.* Abundant.

2395. Dermestes nubilus, *Say.* Common.

2406. Attagenus megatoma, *Fab.* Taken at Pueblo by Mr. Popenoe.

2434*a*. Orphilus subnitidus, *Lec.* Common.

ENDOMYCHIDÆ.

2441. Mycetina morosa, *Lec.* A common intruder in our camp, attacking the hams.

EROTYLIDÆ.

2537. Triplax thoracica, *Say.* Common upon fungi.

2541. Cypherotylus Boisduvali, *Chev.* Common upon pine fungi, upon which both larva and imago feed.

TROGOSITIDÆ.

2682. Trogosita virescens, *Fab.* One specimen.

2688. Tenebreoides corticalis, *Mels.* Two specimens.

2699. Ostoma ferruginea, *Linn.* Four specimens, taken under pine bark in Engelmann's Cañon.

2703. Calitys scabra, *Thunb.* One specimen on pine bark in Chiann Cañon.

NITIDULIDÆ.

2729. Carpophilus pallipennis, *Say.* Four specimens, Colorado Springs.

— Epurœa sp. An undetermined species.

COCCINELLIDÆ.

2827. Hippodamia 5-signata, *Kirby*. Two specimens.

—— Hippodamia 5-signata, var. (*fide Crotch.*) One specimen.

2830. Hippodamia glacialis, *Fab*. One specimen.

2832. Hippodamia convergens, *Guer*. Common.

2835. Hippodamia sinuata, *Muls*. One specimen.

2837. Hippodamia parenthesis, *Say*. Abundant at Colorado Springs.

2847. Coccinella 9-notata, *Hb*. Not common.

2848. Coccinella 5-notata, *Kirby*. Common.

2858. Harmonia picta, *Rand*. "Not before found so far West" (Dr. LeConte); one specimen only.

2863. Anatis Rathvoni, *Lec*. var. Three specimens.

2872. Exochomus marginipennis, *Lec*. var. One specimen.

2872*a*. Exochomus æthiops, *Bland*. Three specimens.

—— Exochomus sp. An undescribed species of this genus was taken by Mr. Popenoe at Pueblo.

2882. Hyperaspis fimbriolata, *Mels*. Taken at Pueblo by Mr. Popenoe.

PARNIDÆ.

2977. Helichus striatus, *Lec*. Abundant in the water below Bridal Veil Falls.

HISTERIDÆ.

3031. Hister instratus, *Lec*. One specimen.

3049. Hister abbreviatus, *Fab*. One specimen.

3131. Saprinus lugens, *Er*. Two specimens.

3133. Saprinus Pennsylvanicus, *Payk*. One specimen.

3134. Saprinus Oregonensis, *Lec*. Common.

LUCANIDÆ.

—— Platycerus sp. "Probably a new species, very close to *P. depressus*, but the hind angles of prothorax are obtuse; the male is required before it can be fully investigated." (Dr. LeConte.)

SCARABÆIDÆ.

3219. Canthon practicola, *Lec*. One specimen.

3230. Canthon hudsonias, *Forst*. One specimen.

3254. Aphodius (near) hamatus, *Say*. One specimen.

3269. Aphodius vittatus, *Say*. Five specimens.

3295. Aphodius Coloradensis, *Horn*. One specimen.

—— Aphodius n. sp. Five specimens; small, with pale elytra.

3381. Trox Sonoræ, *Lec*. Three specimens.

3427. Dichelonycha sulcata, *Lec*. Three specimens.

3429. Serica vespertina, *Schon*. One specimen.

3456. Diplotaxis brevicollis, *Lec*. Fifteen specimens.

3474. Diplotaxis atratula, *Lec*. Twenty specimens.

3564. Tostegoptera lanceolata, *Say*. Ten specimens.

3569. Polyphylla decemlineata, *Say*. One specimen, taken at Colorado Springs.

3597. Cyclocephala immaculata, *Burm*. Taken at Pueblo by Mr. Popenoe.

3609. Ligyrus gibbosus, *DeGeer*. Taken at Pueblo by Mr. Popenoe.

3645. Euryomia Kernii, *Hald*. Several specimens.

3646. Euryomia inda, *Linn*. Common at Colorado Springs.

3659. Cremastochilus Knochii, *Lec*. Two specimens.

3672. Trichius affinis, *Gory*. Abundant in the cañons, and on the mountains nearly to timber line.

BUPRESTIDÆ.

3689. Dicerca prolongata, *Lec*. One specimen.

3696. Dicerca tenebrosa, *Kirby*. Two specimens.

3707. Pœcilonota cyanipes, *Say*. One specimen.

3713. Buprestis confluens, *Say*. Taken at Pueblo by Mr. Popenoe.

3716. Buprestis Nuttalli, *Kirby*. Two specimens.

3718. Buprestis maculiventris, *Say*. Abundant; nearly all our specimens were taken from a single dead pine tree in Engelmann's cañon.

3719*a*. Buprestis Langii, *Mann*. One specimen, taken in Bear Creek cañon, on the trail to Pike's Peak.

3733. Melanophila atropurpurea, *Say*. Common upon pines.

3734. Melanophila Drummondi, *Kirby*. Four specimens.

—— Melanophila Drummondi, var. Six specimens.

3738. Anthaxia inornata, *Rand*. One specimen.

3756. Chrysobothris trinervia, *Kirby*. Six specimens.

3790. Acmæodera ornata, *Fab*. A common species at the base of the mountains.

3791. Acmæodera pulchella, *Hbst*. Common upon flowers in the same localities with the preceding.

3791*b*. Acmæodera mixta, *Lec*. Taken at Pueblo by Mr. Popenoe.

3816. Agrilus interruptus, *Lec*. One specimen.

3841. Brachys ærosa, *Mels*. One specimen.

ELATERIDÆ.

3902. Anelastes Druryi, *Kirby*. One specimen.

3925. Lacon rectangularis, *Say*. Taken at Pueblo by Mr. Popenoe.

3935. Alaus melanops, *Lec*. One specimen was taken in Chiann cañon.

4017. Elater phœnicopterus, *Lec*. One specimen.

4036. Elater mixtus, *Hbst*. One specimen.

—— Elater sp. An undetermined species.

—— Athous simplex, *Lec*., n. sp. (Wheeler's Report.) One specimen.

4333. Asaphes coracinus, *Cand*. Two specimens.

4337. Asaphes mennonius, *Hbst*. One specimen.

4340. Asaphes decoloratus, *Say* var. Two specimens.

LAMPYRIDÆ.

—— Dictyoptera rubripennis, *Lec*. Six specimens, taken at Manitou.

—— Dictyopera ruficollis, *Lec*. One specimen.

4427. Cænia sanguinipennis, *Say*. A "long-lost species." Six specimens were taken at Manitou.

—— Cænia ——. "Probably a new species." (Lec.)

4439. Eros modestus, *Say*. Two specimens.

4453. Photinus nigricans, *Say*. Three specimens

TELEPHORIDÆ.

4481. Chauliognathus basalis, *Lec.* Exceedingly abundant.

—— Podabrus lateralis, *Lec. ms.* A new species, first taken by Lieut. Wheeler's expedition. Five specimens were taken by our party.

4542. Telephorus fidelis, *Lec.* One specimen.

MALACHIDÆ.

4582. Collops bipunctatus, *Say.* Common at Colorado Springs.

—— Collops hirtellus, *Lec.* First taken by Lieut. Wheeler's expedition. We took one specimen only.

—— Pristoscelis, n. sp. Two specimens.

4683. Listrus senilis, *Lec.* Several specimens.

CLERIDÆ.

4716. Clerus ornatus, *Say.* Common upon flowers, especially upon geranium.

4736. Thanasimus nigriventris, *Lec.* One specimen.

4738. Thanasimus mœstus, *Klug.* Three specimens.

4753. Hydnocera subænea, *Lec.* One specimen.

4756. Hydnocera pubescens, *Lec.* One specimen.

4791. Corynetes violaceus, *Linn.* One specimen.

CERAMBYCIDÆ.

4907. Ergates spiculatus, *Lec.* Three specimens, taken in Engelmann's cañon.

4918. Prionus Californicus, *Motsch.* Ten specimens, Engelman's cañon.

4923. Homæsthesis emarginatus, *Say.* Eight specimens, taken on the plains east of Colorado Springs.

4928. Asemum atrum, *Esch.* var. With brown elytra; a single specimen.

4930. Nothorina aspera, *Lec.* One specimen.

4931. Criocephalus productus, *Lec.* Six specimens, South Park.

4933. Criocephalus asperatus, *Lec.* Seven specimens, South Park.

4939. Tetropium cinnamopterum, *Kirby.* Two specimens.

4948. Phymatodes variabilis, *Fab.* One specimen.

4958. Phymatodes dimidiatus, *Kirby.* Two specimens.

5068. Tragidion coquus, *Linn.* One specimen, Engelmann's cañon.

5068*a*. Tragidion fulvipenne, *Say.* Three specimens, same locality.

5077. Batyle ignicollis, *Say.* Four specimens.

5081. Batyle Pearsalli, *Bland.* Common upon *Solidago* in Engelmann's cañon, Ute Pass, and other localities.

—— Xylotrechus, n. sp. Fifteen specimens, taken from pines in Engelmann's cañon.

5134. Neoclytus leucozonus, *Lap.* One specimen.

5180. Pachyta liturata, *Kirby.* Ten specimens upon pines in Engelmann's cañon.

5195. Acmæops tumida, *Lec.* Three specimens.

5198. Acmæops longicornis, *Kirby.* Two specimens.

5198*a*. Acmæops longicornis, *Kirby* var. Two specimens.

5205. Acmæops strigilata, *Fab.* Common on flowers, especially in cañons on eastern border of South Park.

5223. Typocerus brunnicornis, *Lec.* One specimen, South Park.

5224. Typocerus sinnatus, *Newm.* One specimen.

5229. Leptura propinqua, *Bland.* Common upon thistles in Bear Creek cañon, along the trail to Pike's Peak.

5249. Leptura subargentata, *Kirby.* Common in cañons along east border of South Park.

5250. Leptura similis, *Kirby.* Common in same localities with the preceding.

5257. Leptura instabilis, *Hald.* var. A black variety, one specimen.

5257*a*. Leptura convexa, *Lec.* Five specimens, at an altitude of 10,000 ft., upon *Astragalus flexuosus.*

5264. Leptura nigrella, *Say.* One specimen.

—— Leptula nigrella, var. A variety with testaceous elytra; one specimen, chopped from a pine log in a cañon on east border of South Park.

5266*b*. Leptura cribripennis, *Lec.* Eight specimens, taken under pine bark on eastern border of South Park, and in Engelmann's cañon.

5272. Leptura sanguinea, *Lec.* Rather common in cañons along east border of South Park.

5276. Leptura chrysocoma, *Kirby.* Common in Chiann cañon and Engelmann's cañon.

5299. Leptura aspera, *Lec.* Two specimens.

5306. Monilema annulatum, *Say.* A dozen specimens, chiefly upon *Opuntia*, at Colorado Springs.

5323. Monohammus scutellatus, *Say.* Taken abundantly upon pines in Engelmann's cañon; also in South Park.

5377. Acanthocinus obliquus, *Lec.* Four specimens, Engelmann's cañon.

5378. Acanthocinus spectabilis, *Lec.* One specimen, Ute Pass—a rare species.

5381. Dectes spinosus, *Say.* Four specimens, Engelmann's cañon.

5387. Pogonocherus simplex, *Lec.* One specimen.

5388. Pogonocherus mixtus, *Hald.* Four specimens.

5424. Mecas inornata, *Say.* One specimen.

5425. Mecas pergrata, *Say.* One specimen.

5452. Tetraopes annulatus, *Lec.* Four specimens.

SPERMOPHAGIDÆ.

5472. Bruchus discoideus, *Say.* One specimen. "In seeds of *Ipomœa leptophylla.*" (Dr. LeConte.)

—— Bruchus sp. An undetermined species.

5506. Bruchus seminulum, *Horn.* One specimen.

CHRYSOMELIDÆ.

5535. Orsodachna Childreni, *Kirby.* Common upon Pike s Peak.

—— Orsodachna Childreni var. A black variety.

—— Zeugophora n. sp. Common upon *Populus tremuloides* along the Ute Pass road, near "Castellar's."

5564. Saxinis saucia, *Lec.* Two specimens. "Not before found so far east." (Dr. LeConte.)

5574. Coscinoptera vittigera, *Lec.* Rather common in South Park, near Girten's Sulphur Springs.

5609. Cryptocephalus notatus, *Fab.* One specimen.

5642. Pachybrachys atomarius, *Mels.* Three specimens.

5661. Pachybrachys litigiosus, *Suffr.* One specimen.

5664. Pachybrachys hepaticus, *Mels.* One specimen.

—— Pachybrachys sp. An undetermined species.

5665. Adoxus vitis, *Linn.* Three specimens, taken above timber line on Pike's Peak.

5672. Heteraspis marcassita, *Germ.* One specimen.

5688. Chysochus auratus, *Fab.* Rather common at Colorado Springs.

5719. Colaspis tristis, *Oliv.* var. (*fide Crotch*). Two specimens.

5729. Chrysomela exclamationis, *Fab.* Common at Colorado Springs upon *Helianthus lenticularis.*

5780. Chrysomela conjuncta, *Rog.* var. pallida One specimen at Colorado Springs.

5750. Chrysomela (near) auripennis, *Say.* One specimen; elytra more finely punctured than in the typical form.

5751. Chrysomela inornata, *Rog.* One specimen.

—— Chrysomela n. sp. One specimen.

5754. Gastrophysa dissimilis, *Say.* Two specimens.

5791. Luperus cyanellus, *Lec.* Several specimens.

—— Luperus sp. An undescribed species.

5800. Diabrotica tricincta, *Say.* One specimen at Colorado Springs. Taken also at Pueblo by Mr. Popenoe.

5811. Diabrotica atripennis, *Say.* Two specimens.

5831. Monoxia debilis, *Lec.* One specimen.

5834*b*. Trirhabda Canadensis, *Kirby.* One specimen.

5835*a*. Trirhabda luteocincta, *Lec.* Two specimens. "Not before found so far east." (Dr. LeConte.)

—— Graptodera sp. Resembles *foliacea*, but the antennæ are yellow instead of dark.

—— Graptodera sp. An undetermined species.

5886. Graptodera foliacea, *Lec.* Taken at Pueblo by Mr. Popenoe.

5913. Dibolia ærea, *Mels.* One specimen.

5942. Chætocnema denticula, *Ill.* Common at Colorado Springs.

5969. Microrhopala cyanea, *Say.* Taken at Pueblo by Mr. Popenoe.

TENEBRIONIDÆ.

5993. Edrotes rotundus, *Say.* Thirty specimens were taken at Colorado Springs, all of them under "chips," upon an area not more than five rods square.

6002. Trimytis pruinosa, *Lec.* Taken at Pueblo by Mr. Popenoe.

6029. Emmenastus acutus, *Horn.* Abundant under "chips" in South Park.

6068. Asida opaca, *Say.* One specimen only was taken at Colorado Springs. Abundant in the Upper Arkansas valley, west of South Park.

6070. Asida polita, *Say.* Common at Colorado Springs under "chips."

6071. Asida sordida, *Lec.* One specimen at Colorado Springs.

6094. Asida convexicollis, *Lec.* Rare near Colorado Springs.

6097. Asida elata, *Lec.* One specimen.

6098. Ologlyptus anastomosis, *Say.* Taken at Pueblo by Mr. Popenoe.

6105. Eusattus reticulatus, *Say.* Taken at Pueblo by Mr. Popenoe.

6109. Eusattus difficilis, *Lec.* One specimen.

6109*a*. Eusattus convexus, *Lec.* Three specimens, at Colorado Springs.

6126. Coniontis obesa, *Lec.* Several specimens.

6131. Eleodes tricostata, *Say.* Common at Colorado Springs, under "chips."

6132. Eleodes carbonaria, *Say.* Taken by Mr. Popenoe in Pleasant Valley, Arkansas river.

6133. Eleodes obsoleta, *Say.* Exceedingly abundant at Colorado Springs.

6137. Eleodes extricata, *Say.* Common at Colorado Springs.

6149. Eleodes nigrina, *Lec.* Common in South Park.

6150. Eleodes hispilabris, *Say.* Eight specimens, at Colorado Springs.

6165. Eleodes cordata, *Esch.* One specimen.

6167. Eleodes opaca, *Say.* Twenty specimens, found under old bones near Colorado Springs.

6202. Iphthimus serratus, *Mannh.* var. Common under pine bark in Engelmann's cañon.

6208. Upis ceramboides, *Linn.* One specimen.

6244. Blapstinus pratensis, *Lec.* Abundant in South Park.

6266. Tribolium madens, *Charp.* One specimen.

6320. Platydema Oregonense, *Lec.* One specimen.

ALLECULIDÆ.

6375. Hymenorus obscurus, *Say.* Three specimens.

ANTHICIDÆ.

6432. Stereopalpus guttatus, *Lec.* Three specimens.

6442. Corphyra Lewisii, *Horn.* Five specimens.

—— Notoxus sp. An undetermined species.

6511. Anthicus granularis. *Lec.* One specimen.

—— Anthicus sp. An undetermined species, probably new, two specimens.

MELANDRYIDÆ.

6578. Anaspis nigra, *Hald.* Abundant everywhere below timber line, upon *Solidago.*

6583. Anaspis rufa, *Say.* Common in cañons along eastern border of South Park.

6593. Mordella melæna, *Germ.* Common.

6594. Mordella scutellaris, *Fabr.* Common.

—— Mordella sp. Probably a new species. Common.

MELOIDÆ.

6701. Meloe sublævis, *Lec.* Common at Colorado Springs.

—— Meloe sp. An undetermined species, one specimen.

6702. Nomaspis parvula, *Hald.* One specimen.

6731. Epicauta ferruginea, *Say.* Common in Engelmann's cañon, Manitou, Ute Pass, etc.

6732. Epicauta sericans, *Lec.* Common.

6733. Epicauta pruinosa, *Lec.* This and the preceding species were found upon potatoes wherever cultivated, and upon *Astragalus flexuosus* in the mountains.

6738. Epicauta maculata, *Say.* Common.

—— Epicauta maculata var. A variety with large spots, much more common than the typical form of the species.

6750. Pyrota mylabrina, *Chev.* Abundant in vicinity of Denver.

6772. Cantharis viridana, *Lec.* Exceedingly restricted in its distribution, but found in abundance in two or three half-acre spots at an altitude of about 10,000 feet, upon *Astragalus flexuosus*, which seems to be the natural food-plant of several species of *Meloidæ*.

6791. Cantharis sphæricollis, *Say.* Two specimens.

6808. Nemognatha bicolor, *Lec.* Four specimens were taken on thistles at Colorado Springs.

6809. Nemognatha lurida, *Lec.* Common on thistles (*Cirsium undulatum*) at Colorado Springs and along the Ute Pass.

6821. Nemognatha nigripennis, *Lec.* One specimen.

6825. Nemognatha immaculata, *Say.* Twelve specimens were taken at Colorado Springs.

6830. Gnathium minimum, *Say.* Taken by Mr. Popenoe at Pueblo.

OEDEMERIDÆ.

6841. Ditylus obscurus, *Lec.* One specimen.

CURCULIONIDÆ.

6953. Ophryastes vittatus, *Say.* Four specimens, at Colorado Springs.

6954. Thecesternus affinis, *Lec.* One specimen.

—— Cleonus 4-lineatus, *Chevr.* One specimen.

7106. Balaninus nasicus, *Say.* One specimen.

—— Balaninus quercus, *Horn.* One specimen.

—— Acalles basalis, *Lec.* One specimen.

—— Tricalaphus planirostris, *Lec.* n. sp. One specimen, described in Dr. LeConte's monograph on the "Rhynchophora of N. America," p. 413.

—— Baris sp. An undetermined species

—— Aulobaris ibis, *Lec.* Three specimens, South Park.

7281*a*. Sphenophorus vomerinus, *Lec.*, var. baridioides.

7400. Dendroctonous terebrans, *Lec.* Eight specimens, at Colorado Springs.

SCOLYTIDÆ.

7410. Hylastes macer, *Lec.* One specimen.

—— Hylastes longus, *Lec.*, n. sp. Described in Dr. LeConte's "Rhyncophora," p. 389. One specimen.

ANTHRIBIDÆ.

—— Brachytarsus griseus, *Lec.*, n. sp. Described on p. 405 of LeConte's "Rhyncophora." Taken in abundance at Girten's Sulphur Springs, in South Park, upon *Actinella Richardsonii*.

SUMMARY OF SPECIES (not including varieties).

Cicindelidæ	10
Carabidæ	42
Dytiscidæ	5
Staphylindæ	5
Silphidæ	4
Dermestidæ	4
Endomychidæ	1
Erotylidæ	2
Parnidæ	1
Histeridæ	5
Trogositidæ	4
Nitidulidæ	2
Coccinellidæ	12
Lucanidæ	1
Scarabæidæ	19
Buprestidæ	15
Elateridæ	10
Lampyridæ	6
Telephoridæ	3
Malachidæ	4
Cleridæ	6
Cerambycidæ	40
Spermophagidæ	3
Chrysomelidæ	32
Tenebrionidæ	25
Alleculidæ	1
Anthicidæ	5
Melandryidæ	2
Mordellidæ	5
Meloidæ	15
Oedemeridæ	1
Curculionidæ	11
Scolytidæ	2
Anthribidæ	1
Total: families, 34; species	304

In order to furnish the means of estimating the success of our expedition in collecting insects, it may be stated that the number of species of coleoptera collected in Colorado in 1873 by the Government expedition under Lieut. Carpenter, was 165. In the summer of 1872 Mr. J. D. Putnam, of Davenport, Iowa, collected 250 species in the same region.

A LIST OF KANSAS COLEOPTERA.

BY EDWIN A. POPENOE.

The following list of Kansas coleoptera is merely preliminary, and is given as a basis for a more complete collection and more thorough study of our coleopterous fauna, which it is hoped will be made in the course of a few years. It is based upon the species in my own collection, but the list is largely increased by contributions from Prof. F. H. Snow, of the State University at Lawrence, to whom the credit belongs where Lawrence is given as a locality. Additional species were collected by Mr. George P. Cooper, at Topeka and in western Kansas, and by Mr. T. B. Ashton, at Tonganoxie.

Acknowledgments are due to Drs. LeConte and Horn, of Philadelphia, for the determination of many species, and to Mr. Henry Ulke, of Washington City, for similar favors. I also owe thanks to Mr. A. S. Johnson, of the A. T. & S. F. R. R., for opportunities to make collecting trips to the western part of the State, which I have several times enjoyed.

The number of species included at present is about 1,200, and double the number may be reasonably expected after a few years longer work.

I have given any notes on the different species, as to distribution, habits, etc., that I thought would be interesting or useful.

The numbers preceding the names of species correspond to those in Crotch's Check List, the order and nomenclature of which is generally followed, except in the Rhyncophora, where the late work of LeConte and Horn has been the guide.

TOPEKA, KANSAS, July 25, 1877.

CICINDELIDÆ.

AMBLYCHILA, *Say.*

1. *cylindriformis*, Say. Taken by Mr. George Cooper in Gove county. That collector has furnished the following notes on the habits of this interesting species: "They are chiefly nocturnal, and inhabit the sides and clayey banks of ravines, living in holes in the ground or side of the ravine. I took, in one instance, seven specimens from one hole, and have found two or three together since."

A single specimen of this beetle was found by the writer in Webster Park, Col., June, 1876.

TETRACHA, *West.*

9. *virginica*, L. Eastern Kansas; frequent. Crepuscular in habits.

CICINDELA, *L.*

10. *obsoleta*, Say. "Sargent, Kas." (Cooper).

10*b*. *prasina*, Lec. "Sargent, Kas." (Cooper).

14. *pulchra*, Say. Syracuse, Hamilton county; also along line of K. P. R. W. in extreme western Kansas.

15*b*. *rugifrons*, Dej. Var. *Lecontii*, Hald. Lawrence.

15*d*. Var. *scutellaris*, Say. Topeka and Lawrence; is found along streams.

18. *sexguttata*, Fab. Eastern Kansas; frequent; prefers sunny roads and paths in woodlands.

21. *splendida*, Hentz. Eastern Kansas; common.

22. *purpurea*, Oliv. Eastern Kansas; abundant. Var. *Audubonii* also found with the species.

25. *generosa*, Dej. Eastern Kansas; var. *formosa*, Say. From Dodge City west.

27. *fulgida*, Say. Extreme western Kansas.

28. *tranqueburica*, Hb. Lawrence and Topeka.

30. *duodecimguttata*, Dej. Eastern Kansas; common on sunny banks in woodlands.

32. *repanda*, Dej. Eastern Kansas; common.

33. *hirticollis*, Say. Lawrence and Topeka. At the latter locality on sand-bars in the Kansas river; common.

43. *cuprascens*, Lec. Lawrence, Topeka, Hutchinson, and Rooks county. Is found on sand-bars and banks of streams.

45. *macra*, Lec. With the last species, and apparently more common.

46. *sperata*, Lec. (Var.) "Dodge City." (Cooper.)

51. *punctulata*, Fab. Abundant in Eastern Kansas. Taken also in various localities throughout the State. Specimens from western Kansas and Colorado are frequently strongly tinged with blue or gold-green.

60. *circumpicta*, Laf. "Dodge City." (Cooper).

65. *cursitans*, Lec. A few specimens of this species were taken by me at Morgan City, Clay county, in June, 1875.

CARABIDÆ.

OMOPHRON, *Latr.*

72. *americanum*, Dej. Eastern Kansas.

73. *tessellatum*, Say. Bow creek, in Rooks county.

76. *nitidum*, Lec. Lawrence and Bow creek.

ELAPHRUS, *Fab.*

85. *ruscarius*, Say. Eastern Kansas; common, and found on the margins of streams and other muddy spots.

CALOSOMA, *Weber.*

131. *externum*, Say. Eastern Kansas; common.

134. *scrutator*, Fab. Eastern Kansas; common; climbs trees and bushes in search for its insect food.

137. *Sayi*, Dej. Eastern Kansas; rarely found.

138. *peregrinator*, Guer. Western Kansas.

140. *triste*, Lec. Western Kansas.

141. *obsoletum*, Say. Topeka and Lawrence.

142. *semilæve*, Lec. Lawrence.

143. *calidum*, Fab. Eastern Kansas; the most abundant species of the genus; very common in grain-fields in August.

147. *discors*, Lec. Lawrence.

CARABUS, *L.*

155. *serratus*, Say. Eastern Kansas.

159. *sylvosus*, Say. Eastern Kansas; both species are rare at Topeka.

NOMARETUS, *Lec.*

166. *bilobus*, Say. Eastern Kansas; rare.

CYCHRUS, *Fab.*

173. *elevatus*, Fab. Eastern Kansas.

PASIMACHUS, *Bon.*

200. *elongatus*, Lec. Common throughout Kansas.

205. *californicus*, Chd. Eastern Kansas; frequent.

SCARITES, *Fab.*

208. *substriatus*, Hald. Lawrence.

209. *subterraneus*, Fab. Eastern Kansas; common.

DYSCHIRIUS, *Bon.*

220. *globulosus*, Say. Eastern Kansas; common.

224. *sphæricollis*, Say. Topeka and Rooks county. Taken burrowing in sand-bars in Bow creek, Rooks county.

CLIVINA, *Latr.*

250. *dentipes*, Dej. Topeka and Lawrence.

259. *elongata*, Rand. Two specimens of a variety, taken at Topeka.

269. *bipustulata*, Fab. Eastern Kansas; common.

SCHIZOGENIUS, *Putz.*

276. *lineolatus*, Say. Topeka; one specimen.

BRACHYNUS, *Web.*

290. *cyanipennis*, Say. Eastern Kansas.

296. *fumans*, Fab. Eastern Kansas.

PANAGÆUS, *Latr.*

307. *fasciatus*, Say. Lawrence and Topeka; formerly rare, but twenty specimens were taken in the spring of 1877; they were found under stones and boards, on hillsides.

HELLUOMORPHA, *Lap.*

312. *præusta*, Dej. Eastern Kansas.

313. *laticornis*, Dej. Eastern Kansas; both species infrequent.

GALERITA, *Fab.*

317. *atripes*, Lec. Eastern Kansas.

318. *janus*, Fab. Eastern Kansas; both species common.

ZUPHIUM, *Latr.*

322. *americanum*, Dej. Topeka; one specimen.

CASNONIA, *Latr.*

329. *pensylvanica*, L. Eastern Kansas; common.

LEPTOTRACHELUS, *Latr.*

331. *dorsalis*, Fab. Eastern Kansas; infrequent.

LOXOPEZA, *Chd.*

340. *grandis*, Hentz. Eastern Kansas; common. Flies to a light at night.

341. *atriventris*, Say. Eastern Kansas; more common than the last named, and has very similar habits.

LEBIA, *Latr.*

345. *pulchella*, Dej. Topeka; two specimens taken in four years; one of these was captured flying around a light at night.

349. *viridis*, Say. Eastern Kansas; frequently brushed from weeds and flowers, and takes wing very readily.

350. *pumila*, Dej. Topeka; one specimen.

354. *ornata*, Say. Lawrence.

356. *analis*, Dej. Lawrence and Topeka; rare.

DIANCHOMENA, *Chd.*

359. *abdominalis*, Chd. Eastern Kansas.

360. *scapularis*, Dej. Eastern Kansas; abundant under garden refuse.

APHELOGENIA, *Chd.*

366. *bivittata*, Fab. Eastern Kansas; common. Found under refuse heaps in gardens and in similar localities.

368. *divisa*, Lec. Lawrence.

BLECHRUS, *Motsch.*

382. *linearis*, Lec. Topeka; frequent.

384. *lucidus*, Lec. Topeka; frequent.

385. *pusio*, Lec. Topeka.

APENES, *Lec.*

392. *sinuata*, Say. Topeka.

GLYCIA, *Chd.*

394. *purpurea*, Say. Eastern Kansas.

CYMINDIS, *Latr.*

397. *laticollis*, Say. Western Kansas.

398. *brevipennis*, Zimm. With the last.

406. *americana*, Dej. Topeka; one specimen.

PINACODERA, *Schaum.*

411. *platicollis*, Say. Topeka; one specimen.

CALLIDA, *Dej.*

419. *punctata*, Lec. Eastern Kansas; infrequent.

RHOMBODERA, *Reiche.*

423. *pallipes*, Lec. Topeka; one specimen.

CALATHUS, *Bon.*

427. *gregarius*, Say. Eastern Kansas.

PLATYNUS, *Bon.*

456. *decens*, Say. Eastern Kansas.

461. *extensicollis*, Say. Eastern and middle Kansas; common.

463. *decorus*, Say. With the last, and equally common.

483. *punctiformis*, Say. Lawrence.

487. *æruginosus*, Dej. Lawrence.

498. *nutans*, Say. Eastern Kansas.

508. *octopunctatus*, Fab. Eastern Kansas; common.

514. *placidus*, Say. Eastern Kansas; frequent.

520. *obsoletus*, Say. Lawrence.

EVARTHRUS, *Lec.*

549. *sexim pressus*, Lec. Eastern Kansas.
557. *colossus*, Lec. Eastern Kansas.
558. *sodalis*, Lec. var. *corax*. Lawrence and Topeka; frequent.
561. *substriatus*, Lec. Western Kansas; common.
562. *constrictus*, Say. Rooks county and Topeka.

PTEROSTICHUS, *Bon.*

605. *ventralis*, Say. Eastern Kansas.
608. *stygicus*, Say. Topeka.
616. *permundus*, Say. Eastern Kansas; frequent.
624. *Sayi*, Brulle. Eastern Kansas; common.
625. *lucublandus*, Say. With the last, but less common.
629. *caudicalis*, Say. Topeka; frequent.
633. *mutus*, Say. Topeka.
640. *erythropus*, Dej. Lawrence.
642. *patruelis*, Dej. Eastern Kansas.
643. *femoralis*, Kby. Topeka; two specimens.
—— Two undetermined species.

AMARA, *Bon.*

673. *carinata*, Lec. Eastern Kansas; frequent. Often found under dead animals and the like. An undescribed *Amara* (near *carinata*) is found at Topeka and Lawrence.
682. *exarata*, Dej. Eastern Kansas.
685. *latior*, Kby. Lawrence.
688. *angustata*, Say. Lawrence.
694. *impunctico llis*, Say. Abundant throughout the State.
699. *fallax*, Lec. Lawrence.
702. *polita*, Lec. Topeka.
721. *musculus*, Say. Eastern Kansas; frequent.

BADISTER, *Clairv.*

725. *notatus*, Hald. Topeka; under stones, etc., in damp places. Not common.

DIPLOCHILA, *Brulle.*

733. *laticollis*, Lec. Eastern Kansas; not common.
735. *obtusa*, Lec. Topeka; not common. Taken under stones on dry hillsides.

DICÆLUS, *Bon.*

740. *splendidus*, Say. Eastern Kansas; frequent.
745. *sculptilis*, Say. Eastern Kansas; frequent.
752. *elongatus*, Dej. Eastern Kansas; common.

ANOMOGLOSSUS, *Chd.*

758. *emarginatus*, Say. Eastern Kansas; not rare.
759. *pusillus*, Say. Eastern Kansas; common.

CHLÆNIUS, *Bon.*

764. *æstivus*, Say. Eastern Kansas.
765. *erythropus*, Germ. Lawrence.
766. *fuscicornis*, Dej. Topeka.
768. *laticollis*, Say. Eastern Kansas; common.
771. *lithophilus*, Say. Eastern Kansas.
774. *sericeus*, Forst. Eastern Kansas; common.
780. *solitarius*, Say. Eastern Kansas; found on sand-bars, under driftwood.
781. *nemoralis*, Say. Eastern Kansas; frequent.
782. *pensylvanicus*, Say. Eastern Kansas.
783. *tricolor*, Dej. Lawrence.
785. *nebraskensis*, Lec. One specimen taken in western Kansas (Rooks Co).
791. *impunctifrons*, Say. Topeka; one specimen.
795. *tomentosus*, Say. Eastern and middle Kansas; common.

ODES, *Bon.*

805. *cupræus*, Chd. Eastern Kansas, on bars in Kansas River; swims readily on the surface of the water; not common.

NOTHOPUS, *Lec.*

815. *zabroides*, Lec. Western Kansas; (Cooper.)

GEOPINUS, *Lec.*

816. *incrassatus*, Dej. Lawrence and Topeka.

CRATACANTHUS, *Dej.*

818. *dubius*, Bv. Common throughout the State.

AGONODERUS, *Dej.*

822. *lineola*, Fab. Eastern Kansas; common.
824. *comma*, Fab. Eastern and middle Kansas; very abundant.
828. *pauperculus*, Dej. Topeka; common.
830. *testaceus*, Dej. Topeka; frequent.

DISCODERUS, *Lec.*

834. *parallelus*, Hald. Topeka and Lawrence.

ANISODACTYLUS, *Dej.*

843. *rusticus*, Dej. Eastern Kansas; abundant.
843*a*. *tristis*, Dej. Eastern Kansas.
844. *pinguis*, Lec. Lawrence.
845. *dulcicollis*, Laf. Topeka.
846. *carbonarius*, Say. Eastern Kansas; common.
860. *baltimorensis*, Say. Eastern Kansas; abundant.
871. *sericeus*, Harris. Eastern Kansas; common.

XESTONOTUS, *Lec.*

872. *lugubris*, Dej. Topeka; two specimens.

SPONGOPUS, *Lec.*

873. *verticalis*, Lec. Eastern Kansas; common.

AMPHASIA, *Newm.*

874. *interstitialis*, Say. Eastern Kansas; common.

ANISOTARSUS, *Chd.*

878. *terminatus*, Say. Eastern Kansas; common.
879. *agilis*, Dej. Topeka; rare.

GYNANDROPUS, *Dej.*

886. *hylacis*, Say. Lawrence.

BRADYCELLUS, *Er.*

888. *dichrous*, Dej. Lawrence.
890. *autumnalis*, Say. Lawrence.
891. *badipennis*, Hald. Topeka; rare.
892. *atrimedius*, Say. Topeka; rare.
900. *rupestris*, Say. Lawrence.

SELENOPHORUS, *Dej.*

917. *troglodytes*, Dej. Western Kansas.

HARPALUS, *Latr.*

924. *erraticus*, Say. Eastern Kansas.
926. *amputatus*, Say. Western Kansas; also, Topeka. One specimen.
928. *caliginosus*, Fab. Eastern Kansas; very common.
929. *faunus*, Say. Lawrence.
932. *pensylvanicus*, Dej. Eastern Kansas; very common in autumn.

933. *compar*, Lec. Eastern Kansas; equally common with the last named.
934. *erythropus*, Dej. Topeka; not rare.
940. *herbivagus*, Say. Eastern Kansas; very common.
946. *cautus*, Dej. Lawrence.
963. *testaceus*, Lec. Western Kansas, along the Arkansas river. Five specimens, taken by the writer in different localities.

STENOLOPHUS, *Dej.*

976. *conjunctus*, Say. Eastern Kansas; very abundant in winter and spring.
982. *ochropezus*, Say. Eastern Kansas.

PATROBUS, *Dej.*

992. *longicornis*, Say. Topeka and Lawrence.

BEMBIDIUM, *Latr.*

1026. *inæquale*, Say. Eastern Kansas; not common.
1029. *coxendix*, Say. Eastern Kansas and Rooks county; common.
1037. *chalceum*, Dej. Topeka.
1072. *picipes*, Kby. Lawrence.
1080. *cordatum*, Lec. Great Spirit salt spring, Mitchell county.
1090. *dorsale*, Say. Lawrence.
1097. *intermedium*, Kby. Eastern Kansas; common. Also taken by me at Great Spirit spring.
1100. *pictum*, Lec. Eastern Kansas.
1102. *contractum*, Say. Topeka.
—— *texanum*, Chd. (Mss.) A species so named by Dr. LeConte is not rare at Topeka.
1119. *quadrimaculatum*, L. Topeka; common.
1122. *lævigatum*, Say. Eastern Kansas; not common.

TACHYS, *Ziegler.*

1129. *scitulus*, Lec. Lawrence.
1143. *nanus*, Gyll. Lawrence.
1145. *flavicauda*, Say. Topeka.
1148. *tripunctatus*, Say. Topeka.
1149. *vivax*, Lec. Lawrence.
1156. *incurvus*, Say. Topeka and Lawrence.
1160. *dolosus*, Lec. Topeka; common.

PERICOMPSUS, *Lec.*

1165. *ephippiatus*, Say. Lawrence and Topeka; rare. My only specimen was taken from the mud on the bank of a small stream.

HALIPLIDÆ.

HALIPLUS, *Latr.*

1175. *triopsis*, Say. Topeka.
—— One undetermined species.

CNEMIDOTUS, *Er.*

1183. *duodecimpunctatus*, Say. Lawrence and Topeka; rare.

DYTISCIDÆ.

ERETES, *Lap.*

1185. *sticticus*, Linn. Smoky Hill river. (Cooper.)

HYDROPORUS, *Clv.*

1210. *nubilus*, Lec. Topeka and Great Spirit Spring.
1238. *mixtus*, Lec. Topeka; infrequent.
1240. *vittatus*, Lec. Topeka; two specimens.
1246. *modestus*, Aube. Topeka.

CYBISTER, *Curt.*

1273. *fimbriolatus*, Say. Topeka and Rooks county; common.

LACCOPHILUS, *Leach.*

1277. *maculosus*, Germ. Eastern Kansas.
1278. *fasciatus*, Aube. Topeka; very common.
1279. *proximus*, Say. Lawrence and Topeka.

ACILIUS, *Leach.*

1288. *mediatus*, Say. Topeka; a single specimen.

GRAPHODERES, *Esch.*

1294. *liberus*, Say. Eastern Kansas.

COLYMBETES, *Clv.*

1300. *sculptilis*, Harris. Eastern Kansas.

DYTISCUS, *L.*

1316. *hybridus*, Aube. Lawrence and Topeka.

COPTOTOMUS, *Say.*

1338. *interrogatus*, Fab. Eastern Kansas.

COPELATUS, *Er.*

1340. *glyphicus*, Say. Lawrence.
1341. *Chevrolatii*, Aube. Topeka; three specimens.

GAURODYTES, *Thoms.*

1346. *tæniolatus*, Harr. Lawrence.
1369. *stagninus*, Say. Topeka; infrequent.
—— One undetermined species.

GYRINIDÆ.

DINEUTES, *MacL.*

1389. *assimilis*, Aube. Rooks county and eastern Kansas; abundant.

GYRINUS, *L.*

1409. *analis*, Say. Eastern Kansas.
1412. *minutus*, Fab. Topeka; one specimen.

HYDROPHILIDÆ.

HELOPHORUS, *Fab.*

1423. *lineatus*, Say. Topeka.

HYDROCHUS, *Leach.*

1426. *scabratus*, Muls. Topeka; frequent.
1437. *simplex*, Lec. Topeka.

HYDROPHILUS, *Geoff.*

1448. *ovatus*, H. and G. Lawrence.
1449. *triangularis*, Say. Eastern Kansas; common.

TROPISTERNUS, *Sol.*

1450. *nimbatus*, Say. Eastern and middle Kansas; common. Specimens were taken by me from the Great Spirit spring.
1455. *glaber*, Hbst. Less common than the last, and found in the same localities.

HYDROCHARIS, *Latr.*

1461. *obtusatus*, Say. Eastern and middle Kansas; Great Spirit spring; common.

BEROSUS, *Leach.*

1476. *infuscatus*, Lec. Lawrence.
1477. *striatus*, Say. Topeka; not common.

LACCOBIUS, *Er.*

1480. *agilis*, Rand. Topeka and Rooks county.

CHÆTARTHRIA, *Steph.*

1485. *pallida*, Lec. Rooks county.

PHILHYDRUS, *Sol.*

1496. *cinctus*, Say. Lawrence.
1497. *diffusus*, Lec. Lawrence.

1499. *perplexus*, Lec. Eastern Kansas; Great Spirit spring; common.

HYDROBIUS, *Leach.*

—— An undetermined species. Lawrence.

CERCYON *Leach.*

—— An undetermined species. Lawrence.

STAPHYLINIDÆ.

FALAGRIA, *Leach.*

1596. *dissecta*, Er. Topeka.
1597. *venustula*, Er. Topeka; frequent.
—— *N. sp.* Topeka.

HOPLANDRIA, *Kr.*

—— *N. sp.* Topeka.

HOMALOTA, *Mann.*

Six undetermined species, taken at Topeka, are in my collection.

ATEMELES, *Steph.*

1656. *cavus*, Lec. Rare; taken at Tonganoxie, by Mr. T. B. Ashton; a single specimen found by me, at Pueblo, Colorado.

ALEOCHARA, *Grav.*

1660. *lata*, Grav. Eastern Kansas; common.
1662. *bimaculata*, Grav. Eastern Kansas.
1666. *nitida*, Grav. Topeka.

GYROPHÆNA, *Mann.*

1674. *vinula*, Er. Topeka.
1675. *dissimilis*, Er. Topeka.

LEUCOPARYPHUS, *Kr.*

1688. *silphoides*, L. Topeka.

COPROPORUS, *Kr.*

1691. *punctipennis*, Lec. Topeka.
1692. *ventriculus*, Er Topeka.

TACHINUS, *Grav.*

—— An undetermined species. Topeka.

TACHYPORUS, *Grav.*

1708. *jocosus*, Say. Topeka.
1709. *brunneus*, F. Topeka.
1712. *chrysomelinus*, L. Topeka.
1713. *maculipennis*, Lec. Topeka.

CONOSOMA, *Kr.*

—— *scriptum*, Faur. Ms.
1714. *crassum*, Grav. Topeka; rare.
1715. *basale*, Er. Topeka frequent.
—— Two undescribed species. Topeka.

BOLETOBIUS, *Leach.*

1726. *cinctus*, Grav. Topeka; two specimens.

BRYOPORUS, *Kr.*

—— An undetermined species. Topeka.

MYCETOPORUS, *Mann.*

—— One undescribed species. Topeka.

QUEDIUS, *Steph.*

1754. *fulgidus*, Fab. Lawrence and Topeka.
—— An undescribed species. Topeka.

CREOPHILUS, *Kby.*

1771. *villosus*, Grav. Eastern Kansas; common.

LEISTOTROPHUS, *Perty.*

1778. *cingulatus*, Grav. Eastern Kansas.

STAPHYLINUS, *L.*

1777. *maculosus*, Grav. Eastern Kansas; common.
1781. *vulpinus*, Nordm. Eastern Kansas.
1782 *fossator*, Grav. Topeka and Lawrence.
1784. *tomentosus*, Grav Eastern Kansas.

BELONUCHUS, *Nordm.*

1801. *formosus*, Grav. Topeka.

PHILONTHUS, *Leach.*

1802. *cyanipennis*, Fab. Eastern Kansas; found in fungi and n decaying vegetable matter.
1806. *caulus*, Er. Topeka two specimens.
1807. *hepaticus*, Er. Topeka; common.
1818. *palliatus*, Grav. Topeka.
1820. *thoracicus*, Grav. Lawrence and Topeka.
1822. *micans*, Grav. Topeka.
1824. *brunneus*, Grav Topeka.
1833. *baltimorensis*, Grav. Topeka; has the habits of *cyanipennis*.
1837. *pæderoides*, Lec. Topeka.

GYROHYPNUS, *Leach.*

1849. *cephalus*, Say. Topeka.
1854. *pusillus*, Sachse. Topeka.
—— An undetermi ed species. Lawrence.
—— One undescribed species. Topeka.

DIOCHUS, *Er.*

1864. *Schaumii*, Kr. Topeka.

LATHROBIUM, *Grav.*

1869. *puncticolle*, Kby. Lawrence.
1873. *brevipenne*, Lec. Topeka.
1879. *longiusculum*, Grav Topeka and Lawrence.
—— Three undescribed species. Topeka.

CRYPTOBIUM, *Mann.*

1882. *badium*, Grav. Topeka.
1884. *bicolor*, Grav. Eastern Kansas.
1889. *pallipes*, Grav. Eastern Kansas.
1890. *latebricola*, Nordm. Topeka.

RUGILUS, *Leach.*

1896. *angularis*, Er. Topeka.
1897. *dentatus*, Say. Topeka.

SCOPÆUS, *Er.*

—— An undescribed species. Topeka.

LITHOCHARIS, *Er.*

1901. *corticina*, Grav. Topeka.
1902. *confluens*, Say. Topeka and Lawrence.
—— *ochracea*, Grav. Topeka.

SUNIUS, *Steph.*

1908. *longiusculus*, Mann. Topeka; abundant in the fall, winter and spring, under stones and boards.

PÆDERUS, *Grav.*

1914. *littorarius*, Grav. Eastern Kansas; common.

PINOPHILUS, *Grav.*

1921. *opacus*, Lec. Topeka; not common.

STENUS, *Latr.*

1927. *colon*, Say. Topeka; one specimen.
1932. *stygicus*, Say. Topeka.
1933. *colonus*, Er. Topeka.
1934. *egenus*, Er. Topeka; not rare in winter under stones.
1949. *callosus*, Er. Topeka.
—— *N. sp.* Topeka.

EUÆSTHETUS, *Grav.*

1951. *americanus*, Er. Topeka; one specimen.

OXYPORUS, *F.*

1957. *ruficpennis*, Lec. Topeka; rare.
1959. *stygicus*, Say. Topeka; one specimen.

OSORIUS, *Latr.*

1963. *latipes*, Grav. Topeka and Lawrence; frequent.

BLEDIUS, *Leach.*

1968. *rubiginosus*, Er. Lawrence.
1976. *annularis*, Lec. Topeka.

OXYTELUS, *Grav.*

1992. *sculptus*, Grav. Topeka.
1993. *insignitus*, Grav. Topeka.
—— An undetermined species. Topeka.

APOCELLUS, *Er.*

—— *N. sp.* Topeka.

TROGOPHLŒUS, *Mann.*

—— Two new species. Topeka.

ANTHOPHAGUS, *Grav.*

—— One undetermined species. Topeka.

OLOPHRUM, *Er.*

2023. *rotundicolle*, Say. Topeka and Lawrence.

OMALIUM, *Grav.*

—— One undetermined species. Topeka.

GLYPTOMA, *Er.*

2078. *costale*, Er. Topeka; one specimen.

PSELAPHIDÆ.

TMESIPHORUS, *Lec.*

2093. *costalis*, Lec. Topeka; frequent under decayed logs.

CTENISTES, *Reich.*

2096. *pulvereus*, Lec. Topeka.

BRYAXIS, *Leach.*

—— Several undetermined species. Topeka.

SILPHIDÆ.

SILPHA, *Linn.*

2176. *marginata*, Fab. Eastern Kansas; common.
2181. *pustulata*, Hersch. Topeka; a single specimen.
2183. *americana*, Oliv. Eastern Kansas; frequent.
2184. *orbicollis*, Say. Eastern Kansas; infrequent.
2185. *tomentosa*, Web. Eastern Kansas; frequent.

PELTIS, *Geoff.*

2187. *surinamensis*, Fab. Eastern Kansas; common.
2188. *lapponica*, Hb. Lawrence.
2192. *noveboracensis*, Forst. Eastern Kansas; common.
2193. *inæqualis*, Fab. Eastern Kansas; common.
2194. *truncata*, Say. Western Kansas.
2195. *ramosa*, Say. "Fort Dodge and west." (Cooper.)
2196. *americana*, L. Eastern Kansas; frequent.

CHOLEVA, *Latr.*

2206. *opaca*, Say. Eastern Kansas; rare.

CATOPS, *Payk.*

2218. *brunneipennis*, Mann. Topeka; one specimen.

COLENIS, *Er.*

2246. *impunctata*, Lec. Topeka; one specimen.

SCYDMÆNIDÆ.

SCYDMÆNUS, *Latr.*

—— An undetermined species; Topeka.

CORYLOPHIDÆ.

ORTHOPERUS, *Steph.*

2309. *glaber*, Lec.

SACIUM, *Lec.*

—— An undetermined species; Topeka.

SCAPHIDIIDÆ.

SCAPHIDIUM, *Oliv.*

2325. *quadriguttatum*, Say. Eastern Kansas.
2327. *piceum*, Mels. Topeka; two specimens.

SCAPHISOMA, *Leach.*

2333. *convexum*, Say. Topeka.
—— An undetermined species; Topeka.

TOXIDIUM, *Lec.*

2339. *gammaroides*, Lec. Topeka; frequent.

LATRIDIIDÆ.

LATRIDIUS, *Hb.*

—— An undetermined species is common at Topeka.

DERMESTIDÆ.

DERMESTES, *Linn.*

2392. *marmoratus*, Say. Throughout the State.
2393. *Mannerheimii*, Lec. Topeka.
2394. *fasciatus*, Lec. Lawrence.
2395. *nubilus*, Say. Eastern Kansas.
2400. *pulcher*, Lec. Eastern Kansas; rare.
2401. *lardarius*, Linn. Eastern Kansas; introduced. Not common.
2403. *bicolor*, Fab. Lawrence.
2404. *maculatus*, Deg. Lawrence.

ATTAGENUS, *Latr.*

2406. *megatoma*, Fab. Eastern Kansas; frequent.

TROGODERMA, *Latr.*

2418. *tarsalis*, Mels. Eastern Kansas; frequent. This and the preceding are very destructive in collections of bird-skins or insects.

CRYPTORHOPALUM, *Guer.*

2424. *picicorne*, Lec. Topeka.

ANTHRENUS, *Geoff.*

2428. *thoracicus*, Mels. Topeka.
2430. *varius*, Fab. Topeka.

ENDOMYCHIDÆ.

LYCOPERDINA, *Latr.*

2435. *ferruginea*, Lec. Eastern Kansas.

MYCETINA, *Muls.*

2439. *vittata*, Fab. Eastern Kansas.

ENDOMYCHUS, *Helbw.*

2451. *biguttatus*, Say. Eastern Kansas.

ALEXIA, *Steph.*

2456. *minor*, Cr. Topeka.

TRITOMIDÆ.

TRITOMA, *Geoff.*

2457. *punctatus*, Say. Eastern Kansas; not common.
2458. *flexuosus*, Say. Eastern Kansas; frequent.
2463. *pluripunctatus*, Lec. Topeka; rare.

CRYPTOPHAGUS, *Payk.*

—— An undetermined species. Topeka.

LITARGUS, *Er.*

2472. *didesmus*, Say. Topeka; frequent.

TYPHŒA, *Curt.*

2474. *fumata*, L. Lawrence.

CIOIDÆ.

CIS, *Latr.*

—— Three undetermined species, taken at Topeka.

EROTYLIDÆ.

LANGURIA, *Latr.*

2505. *bicolor*, Fab. Eastern Kansas. Var. *punctiollis*, Say, is common on *Cacalia tuberosa*.

2506. *Mozardi*, Latr. Eastern Kansas; not rare.

2509. *angustata*, Bv. Lawrence.

2509*a*. *trifasciata*, Say. Eastern Kansas; found under stones in early spring; rare.

2512. *Lecontei*, Crotch. Eastern Kansas; rare.

DACNE, *Latr.*

2515. *quadrimaculata*, Say. Topeka; one specimen.

HYPODACNE, *Lec.*

—— *punctata*, Lec. Topeka and Lawrence.

MEGALODACNE, *Cr.*

2517. *fasciata*, Fab. Lawrence.

ISCHYRUS, *Lac.*

2520. *quadripunctatus*, Oliv. Eastern Kansas.

MYCOTRETUS, *Lac.*

2524. *pulchra*, Say. Topeka; taken from under walnut bark; rare.

CYRTOTRIPLAX, *Cr.*

2530. *atriventris*, Lec. Topeka; three specimens.

2532. *unicolor*, Say. Eastern Kansas; common.

TRIPLAX, *Hb.*

2537. *thoracica*, Say. Eastern Kansas; common.

2540. *flavicollis*, Lac. Topeka; one specimen.

ATOMARIIDÆ.

TOMARUS, *Lec.*

2562. *pulchellus*, Lec. Topeka.

ATOMARIA, *Steph.*

2573. *ephippiata*, Zimm. Topeka; common.

EPHISTEMUS, *Steph.*

2574. *apicalis*, Lec. Topeka.

LOBERUS, *Lec.*

2576. *impressus*, Lec. Topeka.

SILVANUS, *Latr.*

2579. *advena*, Waltl. Topeka.

2580. *surinamensis*, Linn. Topeka; common; infesting mills and granaries.

2582. *planatus*, Germ. Topeka; under bark.

CUCUJIDÆ.

CATOGENUS, *Westw.*

2592. *rufus*, Fab. Eastern Kansas.

CUCUJUS, *Fab.*

2594. *clavipes*, Fab. Eastern Kansas.

LÆMOPHLÆUS, *Lap.*

2598. *biguttatus*, Say. Lawrence.

ULIOTA, *Latr.*

2610. *dubia*, Fab. Eastern Kansas; frequent.

BITOMIDÆ.

BITOMA, *Hb.*

2614. *striatus*, Mels. Eastern Kansas.

TROGOXYLON, *Lec.*

2618. *parallelopipedum*, Mels. Lawrence.

COLYDIIDÆ.

SYNCHYTODES, *Cr.*

2626. *quadriguttata*, Say. Topeka.

EUDESMA, *Lec.*

2627. *undulata*, Mels. Topeka.

SYNCHITA, *Hellw.*

2628. *granulata*, Say. Topeka.

2629. *nigripennis*, Lec. Lawrence.

CICONES, *Curt.*

2633. *marginalis*, Mels. Topeka.

COLYDIUM, *Fabr.*

2642. *lineola*, Say. Topeka.

BOTHRIDERES, *Er.*

2646. *geminatus*, Say. Topeka.

PHILOTHERMUS, *Aube.*

2652. *glabriculus*, Lec. Topeka.

CERYLON, *Latr.*

2654. *castaneum*, Say. Topeka.

RHYSSODIDÆ.

RHYSSODES, *Dalm.*

3657. *exaratus*, Ill. Eastern Kansas.

RHIZOPHAGIDÆ.

RHIZOPHAGUS, *Hb.*

2663. *bipunctatus*, Say. Topeka; two specimens.

HESPEROBÆNUS, *Lec.*

2670. *rufipes*, Lec. Lawrence.

MONOTOMA, *Hb.*

2673. *fulvipes*, Mels. Lawrence.

TROGOSITIDÆ.

ALYNDRIA, *Er.*

2684. *cylindrica*, Serv. Tonganoxie, Lawrence, Topeka.

TENEBRIOIDES, *Pall.*

2686. *mauritanica*, L. Topeka.

2688. *corticalis*, Mels. Eastern Kansas.

2693. *castanea*, Mels. Topeka; a single specimen, taken under bark.

2693*a*. *laticollis*, Horn. Topeka and Lawrence.

2693*b*. *obscura*, Horn. Topeka.

NITIDULIDÆ.

TRIXAGUS, *Kug.*

2705. *unicolor*, Say. Topeka; taken on flowers of *Cornus*.

CERCUS, *Latr.*

2710. *abdominalis*, Er. Topeka and Lawrence.

CARPOPHILUS, *Steph.*

2726. *hemipterus*, Linn. Topeka.

2728. *rufus*, Murr. Western Kansas.

EPURÆA, *Er.*

2752. *rufa*, Say. Eastern Kansas; an undetermined species; Lawrence.

NITIDULA, *Fabr.*

2753. *bipustulata*, L. Eastern Kansas; common.

2754. *rufipes*, L. Lawrence.

2755. *ziczac*, Say. Throughout Kansas, varying greatly in size; common.

PROMETOPIA, *Er.*

2756. *sexmaculata*, Say. Eastern Kansas.

OMOSITA, *Er.*

2760. *colon*, L. Eastern Kansas; common.

PHENOLIA, *Er.*

2762. *grossa*, Fab. Eastern Kansas. Found in fungi and in decayed wood; frequent.

MELIGETHES, *Steph.*

2766. *sævus*, Lec.

PALLODES, *Er.*

2783. *silaceus*, Er. Topeka; in fungi.

CRYPTARCHA, *Shuck.*

2785. *ampla*, Er. Lawrence.

PITYOPHAGUS, *Shuck.*

2788. *quadriguttatus*, Fab. Eastern Kansas; common.

PHALACRIDÆ.

PHALACRUS, *Payk.*

2806. *politus*, Mels. Topeka; frequent.

OLIBRUS, *Er.*

2817. *consimilis*, Msh. Topeka; common.

2819. *nitidus*, Mels. Topeka; very abundant throughout the year.

—— One undetermined species; Topeka.

COCCINELLIDÆ.

EPILACHNA, *Redt.*

—— *borealis*, Fab. Lawrence.

MEGILLA, *Muls.*

2823. *maculata*, DeG. Eastern Kansas; occurs in great numbers. The most abundantly represented species of the family in this section.

HIPPODAMIA, *Chev.*

2830. *glacialis*, Fab. Throughout the State; common, and varies much in the black elytral markings. A specimen in my cabinet has the markings united into a broad, black triangle, with a small central red dot. Others have three small black dots disposed in a triangle.

2832. *convergens*, Guer. Common throughout Kansas. The most abundant *coccinellid* in Western Kansas, where it occurs on Helianthus and other coarse, strong-scented herbs. Specimens with immaculate elytra are frequent.

2836. *tridecimpunctata*, L. Eastern Kansas; not common.

2837. *parenthesis*, Say. Eastern and Western Kansas; infrequent at Topeka.

COCCINELLA, *Linn.*

2847. *novemnotata*, Hb. Eastern Kansas; common.

2848. *quinquenotata*, Kby. Western Kansas.

CYCLONEDA, *Cr.*

2853. *sanguinea*, L. Eastern and middle Kansas; very abundant.

2854. *oculata*, Fab. Topeka; frequent.

2854*a*. *abdominalis*, Say. Eastern and middle Kansas; occurs with the last in about the same numbers.

ADALIA, *Muls.*

2856. *bipunctata*, Linn. Lawrence.

ANATIS, *Muls.*

2862. *quindecimpunctata*, Oliv. Eastern Kansas.

CHILOCORUS, *Leach.*

2869. *bivulnerus*, Muls. Eastern Kansas; frequent.

EXOCHOMUS, *Redt.*

—— *tripustulatus*, DeG. Topeka.

ŒNEIS, *Muls.*

2784. *pusilla*, Lec. Topeka.

BRACHYACANTHA, *Muls.*

2876. *dentipes*, Fab. Eastern Kansas; common.

2877. *ursina*, F. Eastern Kansas; frequent.

2877*c*. *basalis*, Mels. Lawrence.

HYPERASPIS, *Chev.*

2882. *fimbriolata*, Mels. Topeka; Rooks county.

2889. *proba*, Say. Lawrence.

2892. *lugubris*, Rand. Topeka.

2894. *undulata*, Say. Topeka.

2896. *annexa*, Lec. Western Kansas.

SCYMNUS, *Kug.*

2904. *flavifrons*, Mels. Lawrence.

2919. *hæmorrhous*, Lec. Topeka.

2920. *caudalis*, Lec. Topeka.

—— Three undetermined species. Topeka.

PARNIDÆ.

HELICHUS, *Er.*

2975. *lithophilus*, Germ. Lawrence.

2976. *fastigiatus*, Say. Topeka.

2977. *striatus*, Lec. Topeka; rare.

HETEROCERIDÆ.

HETEROCERUS, *Fab.*

3014. *limbatus*, Kies.

3016. *pallidus*, Say. Topeka and Rooks county.

—— Three other species.

HISTERIDÆ.

HOLOLEPTA, *Payk.*

3023. *fossularis*, Say. Eastern Kansas; frequent.

HISTER, *L.*

3032. *biplagiatus*, Lec. Eastern Kansas; frequent.

3033. *Ulkei*, Horn. Western Kansas.

3037. *Harrisii*, Kby. Eastern Kansas.

3039. *interruptus*, Bv. var. Topeka.

3049. *abbreviatus*, Fab. Topeka; frequent.

3053. *depurator*, Say. Eastern Kansas; frequent.

3055. *incertus*, Mars. Topeka.

3059. *defectus*, Lec. Topeka.

3063. *sedecimstriatus*, Say. Eastern Kansas; common.

3065. *americanus*, Payk. Eastern Kansas; common.

3068. *nubilus*, Lec. Topeka.

3069. *pollutus*, Lec. Lawrence.

3073. *subrotundus*, Say. Topeka and Rooks county; common.

3074. *vernus*, Say. Topeka.

3076. *carolinus*, Payk. Eastern Kansas; under elm bark; common.

3077. *Lecontei*, Mars. Lawrence and Topeka.

EPIERUS, *Er.*

3090. *pulicarius*, Er. Topeka.

TRIBALUS, *Er.*

3094. *americanus*, Lec. Topeka.

PAROMALUS, *Er.*

3103. *estriatus*, Lec. Topeka.
3104. *conjunctus*, Say. Topeka.
3107. *14-striatus*, Steph. Topeka.
3114. *bistriatus*, Er. Topeka.

DENDROPHILUS, *Leach.*

3116. *punctulatus*, Say. Topeka and Lawrence.

SAPRINUS, *Leach.*

3119. *rotundatus*, Kug. Lawrence and Topeka.
3131. *lugens*, Er. Topeka and western Kansas.
3133. *pensylvanicus*, Pk. Throughout Kansas; common. Western specimens seem to have the metallic hues brightest.
3138. *assimilis*, Payk. Throughout Kansas.
3141. *placidus*, Er. Topeka.

BACANIUS, *Lec.*

3186. *miselius*, Lec. Topeka.

LUCANIDÆ.

LUCANUS, *L.*

3202. *elaphus*, F. Lawrence.
3203. *dama*, Thunb. Eastern Kansas; common.
3204. *placidus*, Say. Eastern Kansas; common.

DORCUS, *McL.*

3207. *parallelus*, Say. Topeka and Lawrence; rare.

PLATYCERUS, *Geoff.*

3208. *quercus*, Web. Eastern Kansas.

CERUCHUS, *McL.*

3213. *piceus*, Web. Eastern Kansas.

PASSALUS, *Fab.*

3216. *cornutus*, Fab. Eastern Kansas; frequent.

SCARABÆIDÆ.

CANTHON, *Hoff.*

3228. *viridis*, Bv. Topeka; rare.
3230. *hudsonias*, Forst. Throughout Kansas; abundant at Topeka.

CHŒRIDIUM, *Lep.*

3233. *histeroides*, Web. Eastern Kansas.

COPRIS, *Geoff.*

3234. *carolina*, Linn. Eastern Kansas; rare.
3237. *anaglypticus*, Say. Eastern Kansas; common.
3238. *minutus*, Dru. Eastern Kansas; common.

PHANÆUS, *McL.*

3241. *carnifex*, Linn. Eastern Kansas; abundant.
3242. *triangularis*, Say. Lawrence; rare. Specimens sent me by Mr. G. F. Gaumer.

ONTHOPHAGUS, *Latr.*

3244. *latebrosus*, Fab. Eastern and middle Kansas; common.
—— *pensylvanicus*, Hn. Eastern Kansas.

APHODIUS, *Ill.*

3259. *fimetarius*, L. Eastern Kansas; frequent.
3268. *granarius*, L. Topeka and Lawrence.
3274. *serval*, Say. Lawrence.
3275. *inquinatus*, Hb. Topeka; frequent.
3282. *rubeolus*, Bv. Topeka; rare.
3283. *stercorosus*, Mels. Eastern Kansas.
3291. *concavus*, Say. Eastern Kansas; infrequent.
3293. *alternatus*, Hn. Lawrence.
3296. *bicolor*, Say. Eastern Kansas.
3299. *femoralis*, Say. Eastern Kansas; abundant.
3302. *oblongus*, Say. Topeka.

ATÆNIUS, *Harr.*

3309. *robustus*, Horn. Topeka; rare.
3311. *gracilis*, Mels. Topeka; one specimen.
3313. *stercorator*, Fab. Eastern Kansas.
3319. *abditus*, Hald. Lawrence.

RHYSSEMUS, *Muls.*

—— *new species.* Topeka; found in pools left after rain.

BOLBOCERAS, *Kby.*

3351. *farctus*, Fab. Eastern Kansas; frequent.
3352. *lazarus*, Fab. Eastern Kansas; common.

ODONTÆUS, *Klug.*

3353. *filicornis*, Say. Eastern Kansas; rare.

GEOTRYPES, *Latr.*

3357. *splendidus*, Fab. Eastern Kansas; common.
3359. *Egeriei*, Germ. Eastern Kansas; common.
3360. *opacus*, Hald. Eastern Kansas; infrequent.

CLŒOTUS, *Germ.*

3367. *aphodioides*, Ill. Eastern Kansas; frequent.

TROX, *Fab.*

3375. *pustulatus*, Lec. Eastern Kansas.
3377. *suberosus*, Fab. Lawrence and Topeka.
3378. *morsus*, Lec. Lawrence.
3379. *punctatus*, Germ. Eastern and western Kansas; common.
3381. *Sonoræ.* Topeka; common.
3383. *porcatus*, Say. Lawrence.
3384. *tuberculatus*, DeG. Eastern Kansas.
3386. *foveicollis*, Harold. Lawrence.
3387. *terrestris*, Say. Topeka.
3388. *capillaris*, Say. Topeka; frequent.
3390. *æqualis*, Say. Eastern Kansas.
3394. *atrox*, Lec. Topeka; two specimens.

SERICA, *McL.*

3429. *vespertina*, Sch. Eastern Kansas.
3436. *sericea*, Ill. Eastern Kansas.

MACRODACTYLUS, *Latr.*

3445. *subspinosus*, F. (?) Topeka.

DIPLOTAXIS, *Kby.*

3469. *frondicola*, Say. Eastern Kansas; common.

PHYLLOPHAGA, *Harris.*

3502. *congrua*, Lec. Topeka and Lawrence.
3503. *futilis*, Lec. Lawrence.
3504. *fusca*, Frohl. Eastern Kansas.
3504*d*. *puncticollis*, Bl. Eastern Kansas.
3504*e*. *Drakii*, Kby. Lawrence.
—— *micans*, Lec. Lawrence.
3512. *cognata*, Burm. Lawrence.
3513. *fraterna*, Harr. Lawrence.
3516. *calceata*, Lec. Lawrence.
3517. *marginalis*, Lec. Lawrence.
3518. *crassissima*, Bl. Rooks county.
3520. *rugosa*, Mels. Lawrence.
3523. *ilicis*, Kn. Lawrence.
3527. *hirticula*, Kn. Eastern Kansas.
3528. *hirsuta*, Kn. Lawrence.
3540. *crenulata*, Frohl. Eastern Kansas.
3543. *rubiginosa*, Lec. Lawrence.
3547. *tristis*, Fab. Eastern Kansas; common.

TOSTEGOPTERA, *Bl.*

3564. *tanceolata*, Say. Rare at Topeka, but very common in middle and western Kansas.

MACRANOXIA, *Or.*

3566. *Hammondi*, Lec. Rare at Topeka; common in middle Kansas.

ANOMALA, *Kœppe.*

3577. *varians*, Fab. Eastern Kansas; common.

3578. *minuta*, Burm. Eastern Kansas; less common than the last.

3581. *binotata*, Gyll. Topeka and western Kansas; frequent.

3584. *marginata*, Fab. Eastern Kansas.

STRIGODERMA, *Bm.*

3588. *arboricola*, Fab. Western Kansas; quite rare at Topeka.

PELIDNOTA, *McL.*

3589. *punctata*, L. Eastern Kansas; common.

COTALPA, *Bm.*

3593. *lanigera*, L. Eastern Kansas; not common.

3596. *ursina*, Hn. "Topeka, (?) but without doubt from Kansas." (Cooper.)

CYCLOCEPHALA, *Latr.*

3597. *immaculata*, Burm. Eastern Kansas; very abundant.

CHALEPUS, *McL.*

3607. *trachypygus*, Bm. Eastern Kansas; rare.

—— Another species, "more strongly punctured than *obsoletus*" (Lec.), size of *Ligyrus relictus* (Say.) Dodge City.

LIGYRUS, *Bm.*

3609. *gibbosus*, DeG. Throughout Kansas; very abundant at Topeka, burrowing at the roots of the cocklebur (*Xanthium*).

3612. *relictus*, Say. Eastern Kansas; common about manure piles.

POLYMŒCHUS, *Lec.*

3620. *brevipes*, Lec. Lawrence.

XYLORYCTES, *Hope.*

3621. *satyrus*, Fab. Topeka and Lawrence.

STRATEGUS, *Hope.*

3622. *antæus*, Fab. "Topeka." (Cooper.)

DYNASTES, *Kby.*

3627. *tityus*, Linn. "Smoky Hill river." (Cooper.)

PHILEURUS, *Latr.*

3631. *valgus*, F. Eastern Kansas.

ALLORHINA, *Bm.*

3635. *nitida*, L. Neodesha. (Snow.)

EURYOMIA, *Bm.*

3639. *melancholica*, Gory. Eastern Kansas; abundant; often found gouging ripe fruit in company with *E. inda*, and other beetles.

3640. *sepulchralis*, Fab. Lawrence.

3645. *Kernii*, Hald. Western Kansas; common. A black variety, less common than the species, is found with it in flowers of *Cirsium* and *Argemone*.

3646. *inda*, L. Eastern Kansas; abundant.

3650. *fulgida*, F. Eastern Kansas; frequent; found on *Ascelpias cornuti*.

3651. *areata*, Fab. Extreme western Kansas; found on thistle-heads.

CREMASTOCHILUS, *Kn.*

3659. *Knochii*, Lec. Eastern Kansas; frequent.

OSMODERMA, *Lep.*

3665. *eremicola*, Kn. Eastern and middle Kansas; infrequent.

TRICHIUS, *Fab.*

3672. *affinis*, Gory. Eastern Kansas; common.

VALGUS, *Scriba.*

3674. *canaliculatus*, F. Eastern Kansas; in rotten wood and under logs.

BUPRESTIDÆ.

CHALCOPHORA, *Sol.*

3683. *virginiensis*, Dru. "Topeka." (Cooper.)

3684. *liberta*, Germ. "Topeka." (Cooper.)

3687. *campestris*, Say. Lawrence.

PSILOPTERA, *Sol.*

3688. *Drummondi*, Lap. "Dodge City, and westward to Pueblo, Col." (Cooper.)

DICERCA, *Esch.*

3692. *obscura*, Fab.(?) Lawrence.

3692*a*. *lurida*, Fab. Topeka and Lawrence.

PŒCILONOTA, *Esch.*

3707. *cyanipes*, Say. Two specimens sent me from Tonganoxie, collected there by Mr. Ashton.

3708. *ferrea*, Mels. Lawrence.

BUPRESTIS, *Linn.*

3711. *rufipes*, Oliv. Eastern and middle Kansas; rare.

3713. *confluens*, Say. A few specimens taken by me at Stockton, Rooks county, on a cottonwood log.

3719*a*. *Langii*, Mann. "Topeka." (Cooper).

CINYRA, *Lap.*

3727. *gracilipes*, Mels. Lawrence.

MELANOPHILA, *Esch.*

3732. *longipes*, Say. "Very abundant on Smoky Hill river in August." (Cooper.)

ANTHAXIA, *Esch.*

3740. *viridicornis*, Say. Lawrence.

3741. *viridifrons*, Gory. Lawrence.

CHRYSOBOTHRIS, *Esch.*

3747. *femorata*, Lec. Eastern Kansas; very abundant, and is the parent beetle of the destructive "flat-headed borer."

3747*c*. *Lesueuri*, Gory. Western Kansas.

3764. *sexsignata*, Say. Lawrence.

3767. *azurea*, Lec. var. Lawrence.

ACMÆODERA, *Esch.*

3791. *pulchella*, Hb. Lawrence.

3791*b*. *mixta*, Lec. Eastern Kansas; common, and found on heads of *Lepachys*.

3795. *culta*, Web. Eastern Kansas; common.

PTOSIMA, *Sol.*

3799. *gibbicollis*, Say. Eastern Kansas; not common.

AGRILUS, *Sol.*

3808. *fulgens*, Lec. Lawrence.

3809. *otiosus*, Say. Lawrence.

3809*b*. *defectus*, Lec. Lawrence and Topeka.

3810. *difficilis*, Gory. Lawrence.

3811. *bilineatus*, Weber. Topeka.

3815. *fallax*, Say. Lawrence.

3816. *interruptus*, Lec. Lawrence.
3821. *acutipennis*, Mann. Topeka.
3825. *politus*, Say. Lawrence.

BRACHYS, *Sol.*

3839. *tesselata*, Fab. A single specimen taken by me at Topeka.
3841. *ærosa*, Mels. Topeka; three specimens.
3842. *ærugifrons*, Gory. Lawrence.

THROSCIDÆ.

DRAPETES, *Redt.*

3855. *geminatus*, Say. Topeka; one specimen.
3856. *quadripustulatus*, Bonv. Topeka.

ELATERIDÆ.

STETHON, *Lec.*

3865. *pectorosus*, Lec. Lawrence and Topeka.

DELTOMETOPUS, *Bv.*

3866. *amœnicornis*, Say. Lawrence.

FORNAX, *Lep.*

3874. *badius*, Mels. Lawrence and Topeka.

ADELOCERA, *Latr.*

3914. *impressicollis*, Say. Lawrence.
3915. *discoidea*, Web. Eastern Kansas; frequent.
3920. *marmorata*, Fab. Lawrence.

LACON, *Germ.*

3925. *rectangularis*, Say. Throughout Kansas.

ALAUS, *Esch.*

3932. *gorgops*, Lec. Lawrence.
3933. *oculatus*, L. Eastern and middle Kansas.

CARDIOPHORUS, *Esch.*

3938. *amictus*, Mels. Eastern Kansas.

CRYPTOHYPNUS, *Esch.*

3995. *pectoralis*, Say. Topeka; abundant.

ELATER, *L.*

4005. *linteus*, Say. Lawrence.
4024. *manipularis*, Cand. Lawrence.

DRASTERIUS, *Esch.*

4050. *dorsalis*, Say. Eastern Kansas; common.

MONOCREPIDIUS, *Esch.*

4080. *lividus*, Deg. Eastern Kansas.
4086. *cespertinus*, Fab. Eastern Kansas; abundant.
4090. *auritus*, Hb. Eastern Kansas; common at Topeka.

LUDIUS, *Latr.*

4104. *attenuatus*, Say. Eastern Kansas.

ORTHOSTETHUS, *Lac.*

4106. *infuscatus*, Germ. Lawrence.

CRIGMUS, *Lec.*

4107. *hepaticus*, Germ. Lawrence and Topeka.

AGRIOTES, *Esch.*

4113. *sordidus*, Lec. Topeka.

GLYPHONYX, *Cand.*

4125. *recticollis*, Say. Lawrence.
4126. *testaceus*, Mels. Topeka.

MELANOTUS, *Esch.*

4131. *macer*, Lec. Lawrence and Topeka.
4133. *incertus*, Lec. Lawrence.
4141. *angustatus*, Er. Topeka; occasional.
4145. *scrobicollis*, Lec. Topeka.
4149. *fissilis*, Say. Lawrence.
4150. *communis*, Gyll. Lawrence and Topeka.
4151. *exuberans*, Lec. Topeka.
4156. *infaustus*, Lec. Lawrence.
4157. *cribulosus*, Lec. Lawrence.
4160. *pertinax*, Say. Lawrence.
4161. *dubius*, Lec. Topeka.
4163. *americanus*, Hb. Topeka.
4167. *opacicollis*, Lec. Topeka.
4170. *morosus*, Cand. Lawrence.
—— An undescribed species. Topeka.

LIMONIUS, *Esch.*

4177. *pubicollis*, Lec. Lawrence.
4186. *griseus*, Bv. Eastern Kansas; frequent.
4208. *ectypus*, Say. Topeka.

ATHOUS, *Esch.*

4226. *cucullatus*, Say. Topeka.

CORYMBITES, *Latr.*

4326. *inflatus*, Say. Topeka; infrequent.

SERICOSOMUS, *Esch.*

—— *pauper.* Topeka.

ASAPHES, *Kby.*

4337. *memnonius*, Hb. Eastern Kansas.
4339. *æreus*, Mels. Lawrence.

MELANACTES, *Lec.*

4352. *piceus*, DeG. Topeka and Lawrence.
4354. *morio*, Fab. Topeka and Lawrence.
4355. *puncticollis*, Lec. Topeka and Lawrence.

RHIPICERIDÆ.

ZENOA, *Say.*

4371. *picea*, Bv. Lawrence, Topeka and Tonganoxie. (Mr. Ashton.)

SANDALUS, *Kn.*

4372. *niger*, Kn. Lawrence.
4374. *petrophya*, Kn. Lawrence and Topeka.

DASCYLLIDÆ.

CYPHON, *Fab.*

4391. *punctatus*, Lec. Topeka.
4399. *ruficollis*, Say. Topeka.

PTILODACTYLA, *Latr.*

4417. *serricollis*, Say. Lawrence.

LAMPYRIDÆ.

LYCUS, *Fabr.*

4420. *lateralis*, Mels.

CALOPTERON, *Guer.*

4422. *typicum*, Newm. Lawrence.
4423. *reticulatum*, Fab. Topeka and Lawrence.

EROS, *Newm.*

4430. *coccinatus*, Say. Topeka; not common.
4437. *humeralis*, F. Topeka and Lawrence.
4438. *trilineatus*, Mels. Topeka and Lawrence.
4439. *modestus*, Say. Topeka.

LUCIDOTA, *Lap.*

4446. *atra*, Fab. Eastern Kansas.

PHOTINUS, *Lap.*

4457. *angulatus*, Say. Topeka; frequent.
4459. *angustatus*, Lec. Topeka; frequent.
4465. *pyralis*, Linn. Eastern Kansas; Rooks county.
4467. *scintillans*, Say. Topeka; frequent.

PHOTURIS, *Lec.*

4471. *pennylvanica*, DeG. Eastern Kansas; Rooks county; common.

4473. *divisa*, Lec. Topeka; common.

PHENGODES, *Hoffm.*

4474. *plumosa*, Oliv. Eastern Kansas.

TELEPHORIDÆ.

CHAULIOGNATHUS, *Henlz.*

4477. *americanus*, Forst. Eastern Kansas; very common.

4481. *basalis*, Lec. Western Kansas.

4484. *marginatus*, Fab. Eastern Kansas.

PODABRUS, *Westw.*

4488. *flavicollis*, Lec. Topeka.

4491. *modestus*, Say. Eastern Kansas.

4498. *tomentosus*, Say. Lawrence.

4491. *rugosulus*, Lec. Eastern Kansas.

TELEPHORUS, *Schæffer.*

4519. *excavatus*, Lec. Lawrence.

4520. *carolinus*, Fab. Eastern Kansas.

4524. *imbecillus*, Lec. Lawrence.

4526. *flavipes*, Lec. Topeka; common.

4547. *collaris*, Lec. Topeka and Lawrence.

4548. *bilineatus*, Say. Eastern Kansas.

4550. *divisa*, Lec. Lawrence.

4553. *laticornis*, Say. Lawrence.

TRYPHERUS, *Lec.*

4562. *latipennis*, Germ. Lawrence and Topeka; frequent.

MALACHIIDÆ.

COLLOPS, *Er.*

4576. *tricolor*, Say. Lawrence.

4577. *punctatus*, Lec. Topeka; one specimen.

4582. *bipunctatus*, Say. Western Kansas.

4584. *quadrimaculatus*, F. Eastern Kansas; common.

ANTHOCOMUS, *Er.*

—— An undetermined species. Lawrence.

ATTALUS, *Er.*

4630. *melanopterus*, Er. Topeka.

4636. *otiosus*, Say. Topeka.

4641. *scincetus*, Say. Topeka; common in early spring.

LISTRUS, *Motsch.*

—— One undetermined species. Topeka.

CLERIDÆ.

CYMATODÈRA, *Gray.*

4703. *inornata*, Say. Eastern Kansas.

4705. *undulata*, Say. Eastern and western Kansas.

THANASIMUS, *Latr.*

4725. *nigripes*, Say. Eastern Kansas.

4727. *rosmarus*, Say. Eastern Kansas.

4728. *lunatus*, Spin. Lawrence.

4731. *abruptus*, Lec. "Smoky Hill River" (Cooper).

4740. *thoracicus*, Ol. Lawrence.

HYDNOCERA, *Newm.*

4750. *unifasciata*, Say. Rooks county.

4754. *humeralis*, Say. Eastern Kansas; frequent.

4754*b*. *difficilis*, Lec. Lawrence.

4759. *pallipennis*, Say. Topeka and Lawrence.

CHARIESSA, *Perty.*

4775. *pilosa*, Forst. Topeka and Lawrence.

4775*a*. *onusta*, Say. Topeka.

CREGYA, *Lec.*

4776. *vetusta*, Spin. Lawrence and Topeka.

ORTHOPLEURA, *Spin.*

4781. *damicornis*, Fab. Lawrence.

CORYNETES, *Hb.*

4791. *violaceus*, L. Eastern Kansas.

CUPESIDÆ.

CUPES, *Fab.*

4798. *concolor*, Westw. Lawrence.

PTINIDÆ.

PTINUS, *L.*

4804. *fur*, L. Eastern Kansas; infests museums; destroys entomological and botanical specimens.

4807. *quadrimaculatus*, Mels. Lawrence.

4808. *bimaculatus*, Mels. (?) Topeka.

TRICHODESMA, *Lec.*

4827. *gibbosa*, Say. Tonganoxie and Wakarusa; rare.

HADROBREGMUS, *Thoms.*

4830. *carinatus*, Say. Topeka.

XYLETINUS, *Latr.*

4844. *peltatus*, Harr. Lawrence.

PROTHECA, *Lec.*

4859. *puberula*, Lec. Topeka; three specimens.

PTILINUS, *Geoff.*

4866. *ruficornis*, Say. Topeka.

ENDECATOMUS, *Mell.*

4870. *rugosus*, Rand. Lawrence.

SINOXYLON, *Duf.*

4875. *basilare*, Say. Topeka; rare.

BOSTRYCHUS, *Geoff.*

4877. *bicornis*, Web. Eastern Kansas; infrequent.

AMPHICERUS, *Lec.*

4880. *bicaudatus*, Say. Eastern Kansas; abundant and troublesome in vineyards, boring in the twigs.

DINODERUS, *Steph.*

4883. *punctatus*, Say. Eastern Kansas.

SPONDYLIDÆ.

PARANDRA, *Latr.*

4898. *brunnea*, Fab. Eastern Kansas.

CERAMBYCIDÆ.

ORTHOSOMA, *Serv.*

4915. *brunneum*, Forst. Eastern Kansas.

PRIONUS, *Geoff.*

4916. *laticollis*, Dru. Lawrence.

4919. *imbricornis*, *L.* Eastern Kansas.

HOMÆSTHESIS, *Lec.*

4922. *integer*, Lec. (Snow.)

SMODICUM, *Lec.*

4941. *cucujiforme*, Say. Eastern Kansas.

DULABIUS, *Thoms.*

4943. *brevilineus*, Say. Lawrence.

HYLOTRUPES, *Serv.*

4947. *ligneus*, Fab. Imported in cedar posts. (Cooper.)

PHYMATODES, *Muls.*

4952. *varius*, Fab. Lawrence.

4954. *amœnus*, Say. Lawrence and Topeka.

CHION, *Newm.*

4987. *cinctus*, Dru. Eastern Kansas.

EBURIA, *Serv.*

4991. *quadrigeminata*, Say. Eastern Kansas.

ELAPHIDION, *Serv.*

4999. *simplicicolle*, Hald. Eastern Kansas.

5000. *atomarium*, Dru. Eastern Kansas.

5005. *mucronatum*, F. Eastern Kansas.

5006. *incertum*, Newm. Lawrence and Topeka.

5010. *villosum*, Fab. Eastern Kansas.

5011. *parallelum*, Newm. Lawrence and Topeka.

5017. *cinerascens*, Lec. Lawrence.

HETERACHTHES, *Newm.*

5030. *quadrimaculatus*, Newm. Lawrence.

5031. *ebenus*, Newm. Lawrence and Topeka.

CALLIMOXYS, *Kr.*

5044. *sanguinicollis*, Oliv. Topeka.

MOLORCHUS, *F.*

5047. *bimaculatus*, Say. Topeka.

RHOPALOPHORA, *Serv.*

5051. *longipes*, Say. Eastern Kansas.

TRAGIDION, *Serv.*

5067. *annulatum*, Lec. "Topeka." (Cooper.)

5068. *coquus*, Fab. Eastern Kansas; rare.

5068*a*. *fulvipennis*, Say. Eastern Kansas; more common than *coquus;* taken gouging ripe fruit, watermelons, peaches, etc.

PURPURICENUS, *Serv.*

5070. *humeralis*, Say. Eastern Kansas; frequent.

BATYLE, *Thoms.*

5077. *ignicollis*, Say. Eastern, middle and western Kansas; not common.

5079. *suturalis*, Say. Throughout the State.

5081. *Pearsalli*, Bland. Middle and western Kansas.

TYLOSIS, *Lec.*

5085. *maculata*, Lec. Lawrence.

STENOSPHENUS, *Hald.*

5098. *notatus*, Oliv. Lawrence.

CYLLENE, *Newm.*

5102. *pictus*, Dru. Eastern Kansas.

5103. *robiniæ*, Forst. Eastern Kansas.

5106. *charus*, Say. Eastern Kansas; common on golden-rod (*Solidago rigida*), and varies much in its markings.

GLYCOBIUS, *Lec.*

5110. *speciosus*, Say. Topeka and Lawrence; but two specimens taken.

CALLOIDES, *Lec.*

5111. *nobilis*, Say. Lawrence and Topeka. "Lives in oak wood." (Cooper.)

ARHOPALUS, *Serv.*

5113. *fulminans*, Fab. Eastern and middle Kansas.

XYLOTRECHUS, *Chev.*

5116. *colonus*, Fab. Eastern and middle Kansas; frequent.

NEOCLYTUS, *Thoms.*

5131. *luscus*, F. Lawrence.

5133. *capræa*, Say. Topeka and Lawrence.

5135. *erythrocephalus*, Fab. Eastern Kansas.

EUDERCES, *Lec.*

5147. *picipes*, Fab. Eastern Kansas; common on flowers of *Cornus paniculata.*

DISTENIA, *Serv.*

5155. *undata*, Oliv. Eastern Kansas.

DESMOCERUS, *Serv.*

5156. *pilliatus*, Forst. Eastern Kansas.

TOXOTUS, *Serv.*

5177. *cinnamopterus*, Rand. Eastern Kansas, on dogwood blossoms.

STRANGALIA, *Serv.*

5215. *luteicornis*, F. Lawrence and Topeka.

TYPOCERUS, *Lec.*

5221. *velutinus*, Oliv. Lawrence.

5224. *sinuatus*, Newm. Rare at Topeka, but very abundant in middle and western Kansas, and varies much in coloration.

LEPTURA, *Serv.*

5225. *emarginata*, F. A single specimen, taken at Topeka, by me.

5226. *gigas*, Lec. "Smoky Hill river." (Cooper.)

5257*a*. *convexa*, Lec. Western Kansas.

5280. *proxima*, Say. "Smoky Hill river." (Cooper.) "Western Kansas." (Snow.)

MONILEMA, *Say.*

5306. *annulatum*, Say. Western Kansas; common; lives on *Opuntia* or prickly pear. A larva, probably of this species, was taken at Granada, Col., from the stem of an *Opuntia.*

PSENOCERUS, *Lec.*

5318. *supernotatus*, Say. Lawrence and Topeka.

MONOHAMMUS, *Serv.*

5323. *scutellatus*, Say. "Near Tecumseh, Shawnee county." (Cooper.)

DORCASCHEMA, *Lec.*

5328. *Wildii*, Uhler. Eastern Kansas; rare.

5329. *alternatum*, Say. Eastern Kansas.

5330. *nigrum*, Say. Eastern Kansas; rare.

HETŒMIS, *Hald.*

5331. *cinerea*, Oliv. Lawrence and Topeka.

PLECTRODERA, *Lec.*

5339. *scalator*, F. Eastern and middle Kansas; rare. Lives in willow. (Brous.)

ACANTHODERES, *Serv.*

5342. *decipiens*, Hald. Lawrence.

LEPTOSTYLUS, *Lec.*

5347. *aculifer*, Say. Eastern Kansas.

5355. *macula*, Say. Eastern Kansas.

STERNIDIUS, *Lec.*

5356. *variegatus*, Hald. Lawrence.

5357. *alpha*, Say. Eastern Kansas.

5358. *cinereus*, Lec. Lawrence.

LIOPUS, *Serv.*

5363. *signatus*, Lec. Lawrence.

5365. *querci*, Fitch. Lawrence.

LEPTURGES, *Bates.*

5368. *angulatus*, Lec. Eastern Kansas.

GRAPHISURUS, *Kby.*

5374. *fasciatus*, DeG. Eastern Kansas.

DECTES, *Lec.*

5381. *spinosus*, Say. Eastern Kansas.

ECYRUS, *Lec.*

5392. *exiguus*, Lec. Lawrence.

ONCIDERES, *Serv.*

5403. *cingulatus*, Say. Lawrence.

ATAXIA, *Hald.*

5404. *crypta*, Say. Lawrence.

HIPPOPSIS, *Serv.*

5405. *lemniscata*, Fab. Eastern Kansas.

SAPERDA, *Fab.*

5409. *obliqua*, Say. "Topeka." (Cooper.)
5410. *calcarata*, Say. Topeka and Lawrence.
5412. *candida*, Fab. Eastern Kansas.
5415. *vestita*, Say. "Topeka." (Cooper.)
5416. *discoidea*, Fab. Eastern Kansas.
5417. *tridentata*, Oliv. Eastern Kansas.
5418. *lateralis*, Fab. Eastern Kansas.

MECAS, *Lec.*

5424. *inornata*, Say. Middle and western Kansas.
5425. *pergrata*, Say. "Topeka." (Cooper.)
5426. *gentilis*, Lec. Lawrence.

OBEREA, *Muls.*

5431. *amabilis*, Hald. Topeka and Lawrence.
5433. *tripunctata*, F. Lawrence.
5436. *oculaticollis*, Say. Western Kansas.

TETROPS, *Steph.*

5440. *canescens*, Lec. "Western Kansas." (Cooper.)

TETRAOPES, *Serv.*

5445. *tetraopthalmus*, Forst. Eastern Kansas; very common.
5447. *quinquemaculatus*, Hald. Topeka; frequent.
5448. *femoralis*, Lec. Western Kansas. (Cooper.)

AMPHIONYCHA, *Thoms.*

5453. *flammata*, Newm. Lawrence.
5454. *ardens*, Lec. Topeka and Lawrence; also, in middle Kansas. Found on the stems of *Vernonia.*

SPERMOPHAGIDÆ.

SPERMOPHAGUS, *Sch.*

5459. *Robiniæ*, Sch. Tonganoxie, Topeka and Lawrence; rare.

BRUCHUS, *L.*

5463. *pisi*, L. Eastern Kansas.
5464. *mimus*, Say. Lawrence and Topeka.
5472. *discoideus*, Say. Topeka.
5476. *bivulneratus*, Horn. Topeka; one specimen.
5477. *cruentatus*, Horn. Topeka; common.
5491. *bisignatus*, Horn. Topeka.
5497. *amicus*, Horn. Topeka.
5498. *obsoletus*, Say. Lawrence and Topeka.
5499. *hibisci*, Oliv. Topeka.
5506. *seminulum*, Horn. Topeka; frequent.

CHRYSOMELIDÆ.

DONACIA, *F.*

5521. *subtilis*, Kunze. Lawrence.

MACROPLEA, *Sam.*

5533. *Melsheimeri*, Lac. Lawrence.

ZEUGOPHORA, *Kunze.*

5537. *scutellaris*, Suffr. Topeka; one specimen.

LEMA, *Fabr.*

5550. *collaris*, Say. Topeka; common on *Tradescantia virginica* in spring.
5554. *trilineata*, Oliv. Eastern Kansas; common on *Physalis;* more rarely found on Irish potatoes.

ANOMŒA, *Lac.*

5559. *laticlavia*, Forst. Eastern Kansas; common. Found on *Vernonia.*

BABIA, *Chev.*

5561. *quadriguttatæ*, Oliv. Eastern and middle Kansas; found on *Rhus glabra.*

SAXINIS, *Lac.*

5563. *omogera*, Lac. Topeka; one specimen.
5564. *Saucia*, Lec. Western Kansas.

COSCINOPTERA, *Lac.*

5569. *axillaris*, Cr. Rooks county; two specimens.
5571. *dominicana*, Fab. Eastern and middle Kansas; abundant on *Rhus glabra.*

CHLAMYS, *Kn.*

5575*b*. *polycocca*, Lac. Eastern Kansas; frequent.

MONACHUS, *Chev.*

5579. *saponatus*, Fab. Topeka and Lawrence.

CRYPTOCEPHALUS, *Geoff.*

5583. *congestus*, Fab. Lawrence.
5590. *flaccidus*, Suffr. Lawrence.
5596. *ornatus*, Fab. Eastern Kansas.
5603. *dispersus*, Hald. Eastern and middle Kansas.
5606. *leucomelas*, Suffr. Eastern Kansas.
5608. *mucoreus*, Lec. Eastern and middle Kansas; abundant on *Rhus glabra.*
5612. *quadruplex*, Newm. Eastern and middle Kansas; abundant on *Rhus glabra.*

GRIBURIUS, *Hald.*

5624. *scutellaris*, Fab. Eastern Kansas.

PACHYBRACHYS, *Chev.*

5631. *viduatus*, Fab. Eastern Kansas.
5633. *carbonarius*, Hald. Topeka.
5641. *luridus*, F. Lawrence.
5642. *atomarius*, Mels. Topeka; common.
5644. *infaustus*, Hald. Topeka.
5648. *tridens*, Mels. Lawrence.
5650. *sobrinus*, Hald. Topeka and Lawrence.
5653. *livens*, Lec. Lawrence.
5660. *abdominalis*, Say. Topeka.
5661. *litigiosus*, Suffr. Wallace. (Snow.)
5663. *othonus*, Say. Topeka and Lawrence.
—— *n. sp.* Topeka; frequent.
—— Two undetermined species; Topeka.

FIDIA, *Baly.*

5667. *longipes*, Mels. Eastern Kansas; upon grape leaves.

XANTHONIA, *Baly.*

5668. *decimnotata*, Say. Lawrence.
5669. *villosula*, Mels. Topeka; common; brushed from oak leaves.

HETERASPIS, *Chev.*

5671. *pubescens*, Mels. Topeka and Lawrence.
5672. *marcassita*, Germ. Lawrence.

5673. *nebulosus*, Lec. Topeka; on *Gaura* and *Œnothera*.

5675. *curtipennis*, Mels. Topeka; frequent.

GLYPTOSCELIS, *Lec.*

5681. *crypticus*, Say. Lawrence.

MYOCHROUS, *Chev.*

5685. *denticollis*, Say. Eastern Kansas; common.

5687. *squamosus*, Lec. Western Kansas.

CHRYSOCHUS, *Chev.*

5688. *auratus*, Fab. Eastern Kansas; very common on *Apocynum*.

PARIA, *Lec.*

5694. *sexnotata*, Say. Eastern Kansas.

5694*b*. *quadrinotata*, Say. Eastern Kansas.

5695. *aterrima*, Oliv. Topeka and Lawrence; extremely abundant.

5698. *viridicyanea*, Cr. Eastern Kansas; common on *Ipomea pandurata*, and is also found on sweet potato vines.

METAPARIA, *Cr.*

5699. *clythroides*, Cr. Mitchell county; very abundant on heads of *Petalostemon*.

METACHROMA, *Chev.*

5704. *interrupta*, Say. Stockton, Rooks county. A variety of this species, having unspotted elytra, is found in the same locality.

5710. *pallida*, Say. Eastern Kansas.

COLASPIS, *Fab.*

5714. *favosa*, Say. Eastern and middle Kansas; common at Clay Center, on *Psoralea argophylla*.

5715. *brunnea*, F. Eastern Kansas.

5715*a*. *flavida*, Say. Eastern Kansas.

5716. *prætexta*, Say. Lawrence and Topeka.

5719. *tristis*, Oliv. Eastern and middle Kansas.

5719*a*. *convexa*, Say. Topeka; common.

5719*b*. *puncticollis*, Say. Lawrence.

CHRYSOMELA, *L.*

5722. *clivicollis*, Kby., *var.* The spots are divided into numerous smaller ones, in all Kansas specimens that I have seen. Rare.

5724. *decimlineata*, Say. Abundant throughout the State, preferring the leaves of *Solanum rostratum* to those of any other plant.

5729. *exclamationis*, F. Throughout Kansas; abundant in the middle and western sections, but more rare in the eastern part. Found by me on *Helianthus lenticularis* and *H. petiolaris* only.

5730. *conjuncta*, Rog., var. *pallida*, Say. Western Kansas.

5732. *suturalis*, Fab. Eastern Kansas.

5734. *similis*, Rog. Eastern Kansas; common.

5736. *præcelsis*, Rog. Lawrence.

5739. *multigutlis*, Stal. Eastern Kansas; common on leaves of *Corylus*.

5740*a*. *Spiræ*, Say. Topeka; on wild plum.

5741. *multipunctata*, Say. Eastern Kansas.

GASTROPHYSA, *Chev.*

5753. *polygoni*, L. Topeka and Lawrence.

5754. *dissimilis*, Say. Lawrence.

5755. *cyanea*, Mels. Eastern Kansas; on *Rumex brittanica*. Often very abundant.

PRASOCURIS, *Latr.*

5760. *obliquata*, Cr. Western Kansas.

PLAGIODERA, *Chev.*

5766. *lapponica*, L. Topeka and Lawrence; not common.

5768. *scripta*, F. Eastern Kansas; on leaves of cottonwood and willow trees. Frequent.

5773. *viridis*, Mels. Topeka; two specimens.

CEROTOMA, *Chev.*

5775. *caminea*, F. Eastern Kansas; eats holes in the leaves of bush beans. Sometimes occurring in such numbers as to destroy the plants.

PHYLLOBROTICA, *Redt.*

5776. *decorata*, Say. Topeka and Lawrence; rare.

5777. *discoidea*, Say. Topeka and Lawrence; rare.

PHYLLECHTHRUS, *Lec.*

5780*a*. *atriventris*, Say. Eastern Kansas.

LUPERUS, *Geoff.*

5788. *varicornis*, Lec. Topeka; on composite flowers.

MONOCESTA, *Clk.*

5799. *coryli*, Say. Leavenworth, Lawrence.

DIABROTICA, *Chev.*

5800. *tricincta*, Say. Extreme western Kansas, on *Cucurbita perennis;* common.

5802. *duodecimpunctata*, Oliv. Eastern and middle Kansas; abundant.

5806. *vittata*, F. Eastern Kansas; abundant.

5809. *longicornis*, Say. Eastern Kansas; common.

5811. *atripennis*, Say. Eastern Kansas.

GALERUCA, *Geoff.*

5815. *americana*, F. Topeka; rare, under stones in spring.

5815*a*. *cribrata*, Lec. Topeka; found with the last and also swept from herbage; frequent.

MONOXIA, *Lec.*

5831. *guttulata*, Lec. Western Kansas. (Cooper.)

TRIRHABDA, *Lec.*

5834*b*. *canadensis*, Kby. Lawrence and Topeka.

5837. *convergens*, Lec. (?) Topeka; found abundantly, both beetles and larvæ, on *Xanthoxylum*, at times defoliating the shrubs in a locality.

PACHYONYCHUS, *Chev.*

5840. *paradoxus*, Mels. Topeka; one specimen.

ŒDIONYCHIS, *Latr.*

5847. *gibbitarsis*, Say. Eastern Kansas.

5849. *octomaculata*, Cr. Lawrence.

5851. *vians*, Ill. Topeka; rare.

5854. *thoracica*, F. Eastern Kansas.

5859. *thyamoides*, Cr. Topeka; frequent on *Teucrium*.

DISONYCHA, *Chev.*

5864. *limbicollis*, Lec. Eastern Kansas.

5865. *alternata*, Ill. Eastern and middle Kansas.

5866. *punctigera*, Lec. Eastern Kansas; found in abundance on purslane.

5867. *pensylvanica*, Ill. Eastern Kansas; Rooks county. In the latter locality on *Salix*.

5870. *abbreviata*, Mels. Eastern Kansas.

5873. *triangularis*, Say. Topeka and middle Kansas.

5874. *collaris*, F. Eastern Kansas; common on *Chenopodium album*.

GRAPTODERA, *Chev.*

5876. *chalybea*, Ill. Lawrence; rare.

5886. *foliacea*, Lec. Eastern Kansas; on *Gaura;* also found in Pueblo, Col.

LONGITARSUS, *Latr.*

5891. *melanurus*, Mels. Topeka; common on *Onosmodium.*

—— *n. sp.* Topeka; on *Onosmodium.*

BATOPHILA, *Foud.*

5899. *spuria*, Lec. Lawrence.

ORCHESTRIS, *Kby.*

5904. *vittata*, Fab. Eastern Kansas; very abundant and destructive to garden *Cruciferæ;* found also on wild plants of the same order, especially *Lepidium.*

APHTHONA, *Chev.*

5911. *picta*, Say. Topeka.

5912. *texana*, Cr. Topeka; on *Euphorbia marginata.*

SYSTENA, *Chev.*

5914. *hudsonias*, Forst. Topeka.

5921. *blanda*, Mels. Eastern Kansas; on *Xanthium.*

ORTHALTICA, *Cr.*

5922. *copalina*, F. Eastern Kansas; abundant on *Rhus glabra.*

CREPIDODERA, *Chev.*

5928. *Helxines*, L. Eastern Kansas.

EPITRIX, *Foud.*

5933. *cucumeris*, Harr. Eastern Kansas; abounds on Irish potato vines, as well as on *Cucurbitaceæ.*

CHÆTOCNEMA, *Steph.*

5942. *denticulata*, Ill. Eastern Kansas. An undescribed species, near *denticulata*, occurs at Topeka.

BLEPHARIDA, *Chev.*

5953. *rhois*, Forst. Eastern and middle Kansas; abundant.

STENISPA, *Baly.*

5955. *collaris*, Baly. Topeka; one specimen.

ODONTOTA, *Chev.*

5957. *scapularis*, Oliv. Topeka; two specimens, found on *Corylus.*

5961. *rubra*, Web. Eastern Kansas.

5962. *rosea*, Web. Topeka.

CHARISTENA, *Baly.*

5963. *nigrita*, Oliv. Topeka.

—— One undetermined species; Topeka.

MICRORHOPALA, *Chev.*

5966*a*. *lætula*, Lec. Eastern Kansas; Rooks Co. Common at Topeka, and found on *Solidago rigida.*

5969. *cyanea*, Say. Rooks county, Smoky Hill and Arkansas valleys.

CHELYMORPHA, *Chev.*

5976. *cassidea*, Fab. Eastern Kansas.

PHYSONOTA, *Boh.*

5979. *unipunctata*, Say. Eastern Kansas; on *Vernonia.*

CASSIDA, *Linn.*

5980. *nigripes*, Oliv. Eastern Kansas.

5981. *bivittata*, Say. Eastern Kansas; infrequent.

COPTOCYCLA, *Chev.*

5986. *aurichalcea*, Fab. Eastern Kansas.

5987. *guttata*, Oliv. Eastern Kansas.

5990. *clavata*, Fab. Eastern Kansas; found on leaves of Irish potato.

TENEBRIONIDÆ.

EDROTES, *Lec.*

5993. *rotundus*, Say. "Found very early in spring, on warm days, in the sand-hills south of Dodge City and Cimarron Station." (Cooper.)

TRIMYTIS, *Lec.*

6002. *pruinosa*, Lec. Extreme western Kansas, under "buffalo chips."

EPITARGUS, *Latr.*

6010. *canaliculatus*, Say. Western Kansas.

ASIDA, *Latr.*

6068. *opaca*, Say. Western Kansas.

6070. *polita*, Say. Western Kansas.

6071. *sordida*, Lec. Western Kansas.

6092. *convexa*, Lec. Western Kansas.

6097. *elata*, Lec. Western Kansas.

OLOGLYPTUS, *Lec.*

6098. *anastomosis*, Say. Western Kansas.

EUSATTUS, *Lec.*

6105. *reticulatus*, Say. "Arkansas and Smoky Hill rivers, western part of Kansas." (Cooper.)

ELEODES, *Esch.*

6127. *obscura*, Say. Western Kansas.

6128. *acuta*, Say. Western Kansas.

6129. *suturalis*, Say. Throughout Kansas.

6129*a*. *texana*, Lec. "Western Kansas." (Cooper).

6131. *tricostata*, Say. Throughout the State.

6133. *obsoleta*, Say. Western Kansas.

6137. *extricata*, Say. Western Kansas.

6141. *longicollis*, Lec. Western Kansas.

6150. *hispilabris*, Say. Western Kansas.

6167. *opaca*, Say. From Louisville westward; western Kansas generally.

EMBAPHION, *Say.*

6174. *muricatum*, Say. Western Kansas; in Arkansas and Smoky Hill valleys.

6175. *contusum*, Lec. Smoky Hill valley.

NYCTOBATES, *Guer.*

6199. *pensylvanica*, DeG. Eastern Kansas; abundant.

MERINUS, *Lec.*

6207. *lævis*, Oliv. Lawrence and Topeka; not common.

HAPLANDRUS, *Lec.*

6209. *fsmoratus*, Fab. Lawrence.

CENTRONOPUS, *Sol.*

6217. *calcaratus*, Fab. Topeka.

XYLOPINUS, *Lec,*

6219. *saperdioides*, Oliv. Eastern Kansas.

TENEBRIONELLUS, *Cr.*

6222. *obscurus*, Fab. Eastern Kansas; frequent.

6223. *molitor*, L. Eastern Kansas; frequent.

6224. *castaneus*, Kn. Lawrence.

6225. *tenebrioides*, Bv. Eastern Kansas; abundant.

BLAPSTINUS, *Latr.*

6244. *pratensis*, Lec. Lawrence and Topeka.

6250. *interruptus*, Say. Lawrence.

TRIBOLIUM, *McL.*

6265. *ferrugineum*, Fab. Lawrence and Topeka; at the latter locality, found destroying the ento-

mological specimens in the cabinets of the Academy of Science.

DIŒDUS, *Lec.*

6267. *punctatus*, Lec. Lawrence and Topeka.

THARSUS, *Lec.*

6281. *seditiosus*, Lec. Specimens collected at Tonganoxie, by Mr. T. B. Ashton.

PHALERIA, *Latr.*

6283. *imberbis*, Lec. Eastern Kansas; common.

ANÆDUS, *Bl.*

6289. *brunneus*, Zieg. Topeka; one specimen.

PARATENETUS, *Spin.*

6292. *fuscus*, Lec. Topeka; frequent in spring under stones.

DIAPERIS, *Geoff.*

6308. *hydni*, Fab. Eastern Kansas.

HOPLOCEPHALA, *Lap.*

6310. *viridipennis*, F. Eastern Kansas; not common.

6311. *bicornis*, Oliv. Eastern Kansas; common.

PLATYDEMA, *Lap.*

6312. *excavatum*, Say Eastern Kansas.

6316. *ruficorne*, Sturm. Eastern Kansas.

6317. *flavipes*, Fab. Lawrence.

6319. *ellipticum*, Fab. Eastern Kansas; rare.

6325. *subcostatum*, Lap. Eastern Kansas.

PHYLETHUS, *Meg.*

6326. *bifasciatus*, Say. Lawrence.

BOLITOTHERUS, *Cand.*

6334. *bifurcus*, Fab. Eastern Kansas; common.

RHIPIDANDRUS, *Lec.*

6338. *paradoxus*, Bv Topeka.

STRONGYLIUM, *Kby.*

6366. *tenuicolle*, Kby Lawrence.

ALLECULLIDÆ.

ALLECULA, *Fab.*

6372. *punctulata*, Mels. Topeka and Lawrence.

HYMENORUS, *Muls.*

6374. *pilosus*, Mels. Topeka

6375. *obscurus*, Say. Lawrence.

6377. *niger*, Mels. Topeka.

6378. *communis*, Lec. Lawrence.

6382. *punctatissimus*, Lec. Topeka.

LAGRIIDÆ.

STATIRA, *Latr.*

6411. *gagatina*, Mels. Topeka; frequent.

PYROCHROIDÆ.

PYROCHROA, *Geoff.*

6419. *flabellata*, F. Eastern Kansas.

ANTHICIDÆ.

EURYGENIUS, *Laf.*

6427. *Wildii*, Lec. Lawrence and Topeka.

6428. *murinus*, Hald. Lawrence and Topeka.

STEREOPALPUS, *Laf.*

6430. *Mellyi*, Laf. Topeka and Lawrence.

6431. *badipennis*, Lec. Lawrence.

CORPHYRA, *Say.*

6441. *pulchra*, Lec. Topeka.

MACRATRIA, *Newm.*

6449. *murina*, Fab. Topeka; rare.

NOTOXUS, *Geoff.*

6455. *monodon*, Fab. Eastern Kansas; common.

6464. *planicornis*, Laf. Lawrence.

TOMODERUS, *Laf.*

6466. *interruptus*, Laf. Topeka.

6467. *constrictus*, Say. Topeka.

ANTHICUS, *Leach.*

6474. *formicarius*, Laf. Topeka; common.

6475. *cinctus*, Say. Topeka and Lawrence.

6493. *cervinus*, Laf. Eastern Kansas; very abundant in winter under rubbish.

MELANDRYIDÆ.

SCRAPTIA, *Latr.*

6530. *sericea*, Mels. Lawrence.

CANIFA, *Lec.*

6532. *plagiata*, Mels. Topeka; common.

PENTHE, *Newm.*

6539. *obliquata*, Fab. Eastern Kansas.

6540. *pimelia*, Fab. Eastern Kansas.

OSPHYA, *Ill.*

6542. *varians*, Lec. Topeka and Lawrence.

HYPULUS, *Payk.*

6557. *liturata*, Lec. Topeka and Lawrence.

HALLOMENUS, *Panz.*

6562. *scapularis*, Mels. Topeka rare.

EUSTROPHUS, *Ill.*

6567. *confinis*, Lec. Lawrence.

6568. *bicolor*, Say. Eastern Kansas.

6569. *bifasciatus*, Say. Eastern Kansas.

6570. *tomentosus*, Say. Topeka and Lawrence.

MORDELLIDÆ.

PENTARIA, *Muls.*

6575. *trifasciata*, Mels. Eastern Kansas.

MORDELLA, *Linn.*

6593. *melæna*, Germ. Topeka and Lawrence.

6594. *scutellaris*, Fab. Lawrence; Rooks county.

6597. *octopunctata*, Fab. Topeka; rare.

6598. *marginata*, Mels. Topeka.

6599. *lineata*, Mels. Topeka; common.

6602. *oculata*, Say. Lawrence.

GLIPODES, *Lec.*

6607. *sericans*, Mels. Lawrence.

MORDELLISTENA, *Costa.*

6611. *lutea*, Mels. Topeka.

6619. *ornata*, Mels. Topeka.

6621. *scapularis*, Say. Topeka.

6647. *ambusta*, Lec. Topeka.

6650. *divisa*, Lec. Topeka and Lawrence; common.

—— Several undetermined species.

MACROSIAGON, *Hentz.*

6667. *dimidiata*, Fab. Lawrence.

6668. *flavipennis*, Lec. Topeka.

EMMENADIA, *Laf.*

6672. *pectinata*, F. Topeka and Lawrence.

6673. *Sayi*, Lec. Topeka and Lawrence.

6677. *limbata*, F. Lawrence.

MELOIDÆ.

MELOE, *L.*

6693. *impressus*, Kby. Lawrence.

6699. *angusticollis*, Say. Eastern Kansas.

HENOUS, *Hald.*

6703. *confertus*, Say. Eastern and middle Kansas.

TRICRANIA, *Lec.*

6711. *Stansburii*, Hald. Western Kansas. (Snow.)

MACROBASIS, *Lec.*

6713. *albida*, Say. Western Kansas.

6719. *unicolor*, Kby. Eastern Kansas, on *Astragalus caryocarpus*.

6721. *immaculata*, Say. Western Kansas.

6722. *segmentata*, Say. Western Kansas.

EPICAUTA, *Redt.*

6729. *convolvuli*, Mels. Topeka; one specimen.

6731. *ferruginea*, Say. Western Kansas; Rooks county and Ellinwood. Found on composite flowers.

6732. *sericans*, Lec. Eastern Kansas.

6734. *callosa*, Lec. Rooks county.

6738. *maculata*, Say. Middle and western Kansas.

6739. *vittata*, F. Eastern Kansas.

6744. *cinera*, Frost. Eastern Kansas.

6746. *corvina*, Lec. Western Kansas; very destructive in gardens, with Nos. 6713, 6721, 6722, 6738, devouring the leaves of potatoes, turnips, beets, etc. Pea vines are left untouched by them, so far as observed.

6747. *pensylvanica*, Deg. Eastern Kansas; very abundant in fall upon the flowers of Golden Rod (*Solidago rigida*).

PYROTA, *Lec.*

6750. *mylabrina*, Chev. "Arkansas and Smoky Hill valleys." (Cooper.)

6751. *Engelmanni*, Lec. Western Kansas.

CANTHARIS, *L.*

6791. *sphæricollis*, Say. Rooks county, on *Symphoricarpus occidentalis*.

ZONITIS, *Fab.*

6803. *atripennis*, Say. Western Kansas.

6805. *bilineata*, Say. Eastern and middle Kansas, on *Helianthus*.

NEMOGNATHA, *Ill.*

6810. *apicalis*, Lec. Western Kansas.

6816. *piezata*, Fab. Two specimens received from T. B. Ashton, Tonganoxie.

6821. *nigripennis*, Lec. Western Kansas. (Snow.)

6825. *immaculata*, Say. Eastern and western Kansas.

6826. *vittigera*, Lec. Eastern Kansas; Rooks Co.

GNATHIUM, *Kby.*

6830. *minimum*, Say. Found by the writer on the Saline river, in Russell county, in abundance. Also at Pueblo, Col.; in both localities on heads of *Helianthus*.

ŒDEMERIDÆ.

OXACIS, *Lec.*

6848. *cana*, Lec. Eastern and middle Kansas.

ASCLERA, *Schmidt.*

6861. *ruficollis*, Say. Topeka.

6862. *puncticollis*, Say. Eastern Kansas.

RHYNCHITIDÆ.

EUGNAMPTUS, *Sch.*

collaris, Fab. Topeka; one specimen.

RHYNCHITES, *Hb.*

bicolor, Fab. Eastern Kansas; common on wild roses.

æneus, Boh. Eastern Kansas.

ATTELABIDÆ.

ATTELABUS, *L.*

analis, Ill. Eastern Kansas; found on *Rhus glabra*, and rolls the leaflet, beginning at the point. The eggs, as I believe, are laid in punctures in the midrib.

BYRSOPIDÆ.

THECESTERNUS, *Say.*

humeralis, Say. Throughout the State in its varieties, and apparently not rare.

OTIORHYNCHIDÆ.

MINYOMERUS, *Horn.*

innocuus, Horn. Topeka.

GRAPHORINUS, *Sch.*

vadosus, Say. Eastern Kansas.

EPICÆRUS, *Sch.*

imbricatus, Say. Rather common in eastern and middle Kansas.

OPHRYASTES, *Sch.*

villatus, Say. Western Kansas.

tuberosus, Say. Western Kansas.

latirostris, Lec. Western Kansas.

sulcirostris, Say. Western Kansas.

ANAMETIS, *Horn.*

grisea, Horn. Lawrence, Topeka, and West.

PHYXELIS, *Sch.*

rigidus, Say. Topeka.

OTIORHYNCHUS, *Germ.*

Species undetermined. Lawrence.

DIROTOGNATHUS, *Horn.*

An undescribed species. Topeka.

TANYMECUS, *Sch.*

confertus, Gyll. Eastern Kansas; common.

ARAMIGUS, *Horn.*

tesselatus, Say. Eastern and middle Kansas.

PHACEPHOLIS, *Horn.*

elegans, Horn. Topeka and Lawrence.

candida, Horn. Western Kansas; also at Topeka.

APHRASTUS, *Sch.*

tæniatus, Say. Topeka.

CYPHOMIMUS, *Horn.*

dorsalis, Horn. Topeka; beaten from budding oaks.

CURCULIONIDÆ.

SITONES, *Sch.*

lineellus, Gyll. Topeka; two specimens.

flavescens, Allard. Lawrence.

PHYTONOMUS, *Sch.*

comptus, Say. Topeka; one specimen.

eximius, Lec. Topeka; not common. Found on leaves of *Rumex brittanica*. The pupal stage is passed in a cocoon spun by the larva, on the leaf-surface, usually next to a rib. The cocoon is formed

of yellow-brown threads, loosely interwoven, so that the fabric resembles network. It is broad oval in outline. The pupa within is very nervous, and twists around rapidly when the leaf is touched. Of the larval habits I have observed nothing.

LISTRONOTUS, *Jekel.*

nebulosus, Lec. Lawrence.

latiusculus, Boh. Topeka; frequent; found under stones in spring, and on *Peucedanum fœniculaceum.*

MACROPS, *Kby.*

Several undetermined species, taken at Topeka.

CLEONUS, *Sch.*

trivittatus, Say. Western Kansas.

frontalis, Lec. Topeka; one specimen.

carinicollis, Lec. Western Kansas.

LIXUS, *Fabr.*

punctinasus, Lec. Topeka.

terminalis, Lec. Topeka, on *Polygonum amphibium.*

mucidus, Lec. Topeka and Lawrence.

concavus, Say. Eastern Kansas.

musculus, Say. Topeka.

macer, Lec. Eastern Kansas; frequent.

An unnamed species. Topeka.

DORYTOMUS, *Sch.*

mucidus, Say. Eastern Kansas.

An undetermined species. Topeka.

DESMORIS, *Lec.*

constrictus, Say. Eastern and middle Kansas, on *Helianthus.*

scapalis, Lec. Lawrence.

SMIRCRONYX, *Sch.*

fulvus, Lec. Topeka; common on *Helianthus lenticularis.*

OTIDOCEPHALUS, *Chev.*

An undetermined species. Lawrence.

MAGDALIS, *Germ.*

armicollis, Say. Lawrence and Topeka.

subtinctus, Lec. Topeka.

ANTHONOMUS, *Germ.*

quadrigibbus, Say. Lawrence.

fulvus, Lec. Topeka and western Kansas.

signatus, Say. Topeka.

nigrinus, Boh. Topeka.

MACRORHOPTUS, *Lec.*

estriatus, Lec. Western Kansas; breeds in the seeds of *Callirhœ involucrata.*

TYCHIUS, *Sch.*

sordidus, Lec. Western Kansas.

CONOTRACHELUS, *Sch.*

nenuphar, Hb. Eastern Kansas.

retentus, Say. Topeka.

seniculus, Lec. Topeka; common.

affinis, Boh. Topeka and Lawrence.

nivosus, Lec. Topeka; found on *Euphorbia corollata* abundantly.

adspersus, Lec. Topeka and Lawrence; on *Helianthus.*

posticatus, Say. Topeka and Lawrence.

anaglypticus, Say. Topeka.

leucophœatus, Fahr. Topeka.

RHYSSEMATUS, *Sch.*

lineaticollis, Say. Topeka and Rooks county.

CHALCODERMUS, *Sch.*

æneus, Boh. Topeka.

TYLODERMA, *Say.*

foveolatum, Say. Eastern Kansas; frequent at Topeka, and found on *Gaura.*

æreum, Say. Eastern Kansas; more common than the last named, and found on the same plant.

CRYPTORHYNCHUS, *Ill.*

bisignatus, Say. Topeka.

obtentus, Hb. Topeka.

tristis, Lec. Topeka.

PIAZURUS, *Sch.*

oculatus, Say. Topeka.

COPTURUS, *Sch.*

operculatus, Say. Topeka and Lawrence.

CŒLIODES, *Sch.*

curtus, Say. Topeka.

acephalus, Say. Topeka, on *Gaura* and *Œnothera*; common.

cruralis, Lec. Topeka.

CEUTORHYNCHUS, *Germ,*

sulcipennis, Lec. Topeka.

RHINONCUS, *Sch.*

pericarpius, L. Topeka; frequent.

pyrrhopus, Boh. Eastern Kansas; common on *Polygonum.*

ORTHORIS, *Lec.*

Crotchii, Lec. Western Kansas.

TRICHOBARIS, *Lec.*

texana, Lec. Topeka and westward; on *Helianthus.*

trinotata, Say. Eastern Kansas; common.

AULOBARIS, *Lec.*

naso, Lec. Topeka.

BARIS, *Germ.*

strennua, Lec. Topeka.

ONYCHOBARIS, *Lec.*

subtonsa, Lec. Topeka; abundant on *Oxybaphus nyctagineus.*

PSEUDOBARIS, *Lec.*

farcta, Lec. Eastern Kansas; on *Salvia Pitcheri.*

angusta, Lec. Topeka.

MADARUS, *Sch.*

undulatus, Say. Topeka.

CENTRINUS, *Sch.*

scutellum-album, Say. Eastern Kansas.

penicellus, Hb. Eastern Kansas.

perscillus, Gyll. Topeka.

picumnus, Hb. Topeka.

decipiens, Lec. Western Kansas.

BALANINUS, *Germ.*

nasicus, Say. Eastern Kansas.

BRENTHIDÆ.

EUPSALIS, *Lac.*

minuta, Drury. Eastern Kansas.

CALANDRIDÆ.

SPHENOPHORUS, *Sch.*

callosus, Oliv. Topeka.

parvulus, Gyll. Topeka and Lawrence.

sculptilis, Uhl. Topeka.

costipennis, —. Topeka.
cultellatus, —. Lawrence and Topeka.
scoparius, —. Lawrence.
vomerinus, Lec. Western Kansas.
Two undetermined species.

RHODOBÆNUS, *Lec.*

tridecimpunctatus, Ill. Common throughout the State; most frequently found on ironweed (*Vernonia*) at Topeka.

CALANDRA, *Clairv.*

oryzæ, F. Topeka; one specimen.
granaria, F. Topeka. Introduced in grain from the United States Department of Agriculture, but fortunately detected before the grain was sown. I know of no weevil-infested granaries in this neighborhood.

DYROPHTHORUS, *Sch.*

corticalis, Say. Topeka; in decayed wood.

COSSONUS, *Clairv.*

corticola, Say. Lawrence and Topeka; found under bark.

SCOLYTIDÆ.

XYLEBORUS, *Eich.*

celsus, Eich. Lawrence and Topeka.
xylographus, Say. Lawrence and Topeka.

ANTHRIBIDÆ.

CRATOPARIS, *Sch.*

lunatus, Fab. Eastern Kansas.

BRACHYTARSUS, *Sch.*

variegatus, Say. Topeka; occasional.

APIONIDÆ.

APION, *Hb.*

segnipes, Say. Topeka.
sp. undet. Topeka; on *Psoralea floribunda.*
sp. undet. Topeka; on *Helianthus lenticularis.*

CENTENNIAL CATALOGUE OF THE PLANTS OF KANSAS.

BY PROF. JAMES H. CARRUTH, OF LAWRENCE.

It is not supposed that the botanical survey of Kansas is by any means complete. Not including the Cryptogamia below the Filices, Porter & Coulter's Flora of Colorado contains the names of about 1,050 species; Colman's catalogue of Michigan Southern peninsula, 1,375. Wood's Class-Book gives east of the Mississippi, including the South Atlantic and Gulf States, about 3,900. I have understood that Prof. Aughey, of Lincoln College, Neb., has a catalogue for that State of about 1,600. This may include the lower Cryptogamia. Probably we have in Kansas 1,200 to 1,500. We already have the names of about 1,080. Of these I have seen about 900. We have more to do. But, it being the centennial year, it has been thought advisable to have a centennial catalogue, including the species already known. I have not seen all of which I give the names, but shall give none of which I do not think I have reliable information. In such cases I shall give the names of my informants. Many of those heretofore given on the authority of others I have myself since seen, and give them as of my own knowledge.

OBSERVERS.

I have not traveled widely, but have been greatly aided by the observations of others. Before 1871, Mr. E. Hall, of Illinois, journeyed in Kansas, and published his observations. Prof. Snow, of the State University, and his students, have had their eyes open, and seen many plants. W. H. Saunders, M. D., recently of Lawrence, has reported a goodly number. In 1874 and 1875, L. Watson, M. D., sent me 400 to 500 species, often many specimens of each; a few this year. Mr. J. Henry, of Salina, sent me in 1875 about 150 species. Mr. E. A. Popenoe, of Topeka, has traveled in western Kansas, and reported quite a number. Prof. Mudge has sent some species. In 1876, W. S. Newlon, M. D., of Oswego, sent me about 200; a few in 1875. Mrs. Jewell (Miss E. C. Wright), of Irving, has sent several, and reported more. In 1874, Miss M. P. Wright, of Burlington, brought me about a dozen, four of which I had not seen here. I am indebted to Mr. James Wilson, of Leavenworth, for specimens of nearly all the ferns hitherto found in Kansas. A few other names will be found in the catalogue.

INSTRUCTORS.

We are out of the field of Wood and Gray, and many of our plants are not in their books. This is especially true of those of Western Kansas. I have been greatly aided in determining Western plants by Porter & Coulter's Flora of Colorado, which Dr. Watson put me in the way of getting. But some plants are in no book which I have. Again, Western plants are often small, and, when dry, difficult to determine. Again, plants do not always grow according to the books, and then it is not easy to tell whether they are varieties of species described in books which I have, or species of which I have no description. In such cases, I have had the help—which I gladly acknowledge—of Prof. Wood, Mr. E. Hall, and Mr. S. Watson. Also, in 1873, Dr. S. H. Wright, of Penn Yan, N. Y., aided me in the Cyperaceæ.

CHARACTERISTICS OF THE FIELD.

Our flora differs considerably from that of the Eastern States. We have no peat swamps, and, consequently, lack the plants peculiar to such places. I have never seen in Kansas a specimen of the large order Ericaceæ, including the huckleberry, cranberry, wintergreen, rhododendron, azaleas, etc. A year or two ago, a specimen of Indian pipe, or ghost flower, was reported in Douglas county; and lately I learn that the huckleberry grows in the southeast corner of the State. The chestnut, beech and alder are not found native, so far as I know. The black birch is found in southeast Kansas. The tulip tree and magnolia are wanting. The only evergreen is red cedar, and this is very rare. I once thought the Cyperaceæ were rare, but find there are many species, though few are very abundant. Leguminosæ, Compositæ, and grasses abound. We have most of the oaks and hickories. Ferns, mosses, lichens and fungi are not numerous, and ground pines are wanting.

CHANGES OF PLANTS.

The introduction of civilized society into Kansas has brought many plants not found on the prairies. The burdock, dandelion, plantain, mayweed, knotgrass, and many others that grow about buildings and on roadsides, stick to civilized man like his vices. In consequence of the disappearance of the buffalo, our taller grasses are moving westward, and taking the place of the buffalo grass. In older places, where cattle feed much, these same grasses are killed out, and their places occupied by the soft carpet of the many-jointed drop-seed grasses.

Some plants appear and disappear from causes not very manifest—perhaps difference of seasons. In 1875, the *Solanum rostratum*, a prickly plant with yellow flowers, occupied nearly all the vacant land in Lawrence. In 1876 it is very rare. In 1875 I scarcely saw the clammy ground-cherry at all; this year it has come back again. Some plants found, though rarely, years ago, I have not seen for a long time.

USE OF BOTANY.

Some people do not know any use of botany but to please young ladies. It shows us the fingerwork of the Almighty, in which He takes pleasure. He certainly did not make all these things for our pleasure, for many of them we never see, or do not notice. But, if He takes pleasure in them, it is not an unworthy subject of study. And it is not without utility. One person will transplant a wild grapevine expecting fruit, when it is a staminate vine and can never be productive. Another will set out a whole garden full of pistillate strawberries, and wonder why there is no fruit. Another will cut off the "false blossoms" of the cucumber to make them bear better. Another will plant different varieties of corn, melons, etc., near each other, and wonder why they mix. Another, having learned that they do mix, wonders why potatoes do not mix. A little knowledge of botany would explain these things.

SPECIES, OR VARIETIES.

For some years past botanists have been inclined to regard forms of plants, which had been considered distinct species, as only varieties of the same. Thus *Polygonum erectum* has been regarded as only a variety of *P. aviculare; Amarantus blitum* of *A. albus; Physalis lanceolata* of *P. Pennsylvanica; P. nyctaginea* of *P. viscosa*, and *Vitis riparia* of *V. cordifolia.* I think this tendency arises from studying plants in the herbarium rather than in the field. Some characters of a plant do not always appear in the small portion detached for the herbarium. Tint of color, sometimes of no account as a mark, is sometimes constant and characteristic, and yet may not appear in the dried specimen. A leaf which shines when growing may appear dull when dry. So of odor or viscidity. The habit or mode of growth of a plant may not appear in a branch. It may require close observation of plants in the field to determine some of these cases. I think that if two forms of the same family grow often near each other without ever graduating into each other, however similar, they should be regarded as distinct species. The botanists, so far as I know, give us but one species of pumpkin, *Cucurbita pepo.* I have seen the common red pumpkin varying in tint of red; and flat, round or oblong. I have often seen, in the same field, the cream-colored pumpkin with deeper-colored flesh, varying in the same way in form, but I never saw an intermediate. I never saw the former with spotted leaves, nor the latter without them. I believe them to be distinct species. But, if an intermediate form is seen, it does not prove the two to be identical, for the intermediate may be a distinct species different from either, or it may be a hybrid that will soon return to its original type. Botanists speak of hybrids between *Verbena stricta* and *V. angustifolia.* I think I have seen such about half-way between both.

Polygonum aviculare and *P. erectum* may be hard to distinguish in hand specimens, but let any one see them growing together, the latter growing up through a patch of the former, and it will be hard to regard them as only varieties. The difference in tint of color, shape of leaf and mode of growth is constant, and I am glad to see that Mr. S. Watson restores *P. erectum* to its place.

Amarantus blitum had a place in Eaton and in older editions of Wood, but of late has disappeared, and it made me a good deal of trouble to find it out. Dried branches of both are hard to distinguish. Both have a very narrow border of white around the leaves. But *A. albus* stands or sits erect, sending out stiff branches all the way up. It rots off in the fall, and is to be seen all winter blown against the fences. *A. blitum* lies flat on the ground like purslane, and, when killed by frost, is soon rotten. This, too, I am glad to see, Mr. S. Watson considers entitled to its old place.

Physalis Pennsylvanica and *P. lanceolata* have leaves and blossoms very similar. But *P. lanceolata* is puberulent, branching from the ground, ascending, about ten inches high. *P. Pennsylvanica* has a smooth, clean, erect stem for about a foot, and then branches for about another foot. *P. lanceolata* has the fruit calyx deeply concave at base, like the inside of a hollow hemisphere. *P. Pennsylvanica* always has the calyx truncate at base, or the radiating veins curving outward. I cannot believe them identical.

If I rightly apply the names, *P. viscosa* and *P. nyctaginea* have leaves similar in form, though not in size, and have blossoms very small, three or four lines in diameter, and fruit calyx roundish. But *P. viscosa* sends out its strong arms almost horizontally, one and one-half feet; the leaves are brownish green, the flowers have a brown center, and the fruit calyx is five-angled. *P. nyctaginea* forks at every joint, the leaves are yellowish-green, flowers all yellow, and fruit calyx ten-angled. It is viscid and odorous—points not noticed in the only description I have, that of Wood's Botanist and Florist.

Another *Physalis* grows here, which Dr. Gray and Mr. Watson refer to *P. lanceolata*, Dr. Gray calling it variety *hirta.* It branches from the ground like that, and the stem is weak and leaning, but the leaves are always rhombic-oval, entire; the flowers are all

yellow, and the fruit calyx is more like that of *P. pubescens.* It never varies into any other, and answers to no description which I have seen.

Vitis cordifolia and *V. riparia* were once regarded as distinct species, but have long been considered only varieties. Dr. Gray says Dr. Engelmann thinks *V. riparia* should be restored. The very brief descriptions of Eaton are all that I have seen of each as distinct. Since they have been regarded as one, the description of the united species will not apply to both. *V. cordifolia,* of the books, is distinguished from *V. vulpina* by saying that the latter has leaves shining, especially below; while the leaves of the former are dull. Also, fruit ripe in October. The *Vitis* common here, which I take to be *V. riparia,* has leaves shining on both sides, gash-toothed, with acuminate teeth; fruit clusters compact, ripe in July and August, and very pleasant. Two plants, quite different from this, observed two years ago, were destroyed. I have found another this year—leaves dull, dark green above, teeth crenate, mucronate; fruit ripe in October, and, as Dr. Gray says of *V. cordifolia,* "very acerb." I suppose this to be *V. cordifolia,* and cannot but think the two are distinct species.

Dr. Gray thinks *Helianthus doronicoides* the original of *H. tuberosus,* the artichoke. When I came to Kansas I found *Helianthi* looking very much like artichokes, but on examination found no tubers. Last year I found what appeared to be *H. doronicoides,* with small tubers. Farmers plow them up. Last spring I sent East and got artichokes, which have grown well and blossomed. The very early frost prevented me from comparing them with the wild as fully as I had intended. I have observed no difference, unless it be that the disks of the wild, in fruit, are larger. Gray describes only *H. doronicoides;* Eaton only *H. tuberosus.* Wood has both, but his descriptions do not decidedly differ, only in that of *H. doronicoides* no mention is made of tubers. If there is a *H. doronicoides* always without tubers, I should consider them distinct. As it is, I wish to observe further.

CUTTING POTATOES.

For some years I cut potatoes, as others did, into small pieces for planting, and uniformly had a large part of them rot, some varieties more than others. Why was it? I think I understand it.

In August, a nurseryman may take any bud from a branch of the same year, put it into another tree, and have it grow. But if all the buds are left till the next spring, only two or three buds will grow, and the rest become abortive. Now a potato or other tuber is an underground branch, the eyes corresponding to buds. If you divide the potato before it has begun to sprout, the strength of the eyes is nearly equal, and any one may grow; but when potatoes are planted whole, a few of the eyes at one end sprout and the rest become abortive; and if the potatoes are cut after the strong eyes have sprouted, the weaker ones have not vitality enough left to grow.

One farmer has told me that he had no difficulty in raising potatoes from tubers cut at any time. This must be owing to the greater vigor and vitality of his variety. In this potatoes differ. Last year my Peachblows survived the attacks of the grasshoppers; the Early Roses were killed.

GRASSES.

Chemists have analyzed the cultivated grasses, and find them varying in their proportion of saccharine, mucilaginous and other matters, and consequently in their value as food for stock. Wild grasses, no doubt, vary too, but to determine the value of grasses we should consider quantity as well as quality. Mr. Hall says that three grasses, *Andropogon furcatus,* blue-stem; *A. scoparius,* broom-grass, which grows three feet high and has several erect branches, with a spike on each; and *Sorghum nutans,* wood-grass, which grows four or five feet high, and has a tawny, nodding panicle, make 80 per cent. of the prairie grasses. They are killed out by close feeding, but farmers near Lawrence

keep their cattle off their mowing grounds, and get good crops every year. So long as this can be done, I see no necessity for introducing foreign grasses.

The most abundant grass on the bottoms is *Spartina cynosuroides*, cord-grass. It grows very tall, and has twenty to thirty shoe-brush-shaped spikes near the top. The leaves are very long and strong, and would make good bands for grain. When full grown it is too coarse and tough to make good fodder, but my cow ate readily the green leaves cut in July.

Another valuable grass is *Sporobolus vaginæflorus*, one of those called drop-seed grass. It grows only about a foot high, has many joints, and has seed under the sheaths of the leaves. It leans over and can hardly be cut, and consequently has no value for hay; but where other grasses are killed out by close feeding this comes in and forms a soft, fine carpet. It is nutritious. A man told me that his cows, having abundance of it for one day, gave each a quart of milk more than usual. Few of the other grasses, except the five mentioned, make a turf over large spaces, but are scattered here and there. Some of them might be valuable, if cultivated. Mr. Hall speaks highly of *Sporobolus heterolepis*. It is a fine, erect grass, two feet high, but is rare here.

To save space I abbreviate the names of places and omit the names of persons, except in the case of plants reported and not seen. It will be understood that plants from Ellis were sent by Dr. Watson; from Salina, by Mr. Henry; from Oswego, by Dr. Newlon; from Irving, by Mrs. Jewell; from Burlington, by Miss M. P. Wright; and from Leavenworth, by Prof. Wherrell. Law. stands for Lawrence and vicinity, Osaw. for Osawatomie, Ell. for Ellis, Sal. for Salina, Osw. for Oswego, Top. for Topeka, Irv. for Irving, Leav. for Leavenworth, and Burl. for Burlington.

Plants supposed to be not native are marked thus, *. Plants not found east of the Mississippi, thus, †.

A few names I am obliged to give without their authors.

LAWRENCE, December, 1876.

PLANTS OF KANSAS.

RANUNCULACEÆ.

Clematis, Virgin's Bower.

1. C. verticillaris, DC. Black Jack: Mrs. J. Craig.
2. C. Virginiana, L. Law.
3. C. Viorna, L. Law., Osw.
4. C. Pitcheri, T. & G. Law. and Burl. One specimen each place.
5. †C. Fremontii. Lost; rediscovered at Ellis by Dr. Watson.

Anemone, Wind Flower.

6. A. patens, L. W. Kansas: Snow.
7. A. Caroliniana, Willd. Law., Ell., Osw.
8. A. cylindrica, Gr. Law.
9. A. Pennsylvanica, L. Law.

Thalictrum, Meadow Rue.

10. T. Cornuti, L. Law., Ell.

Ranunculus, Buttercups.

11. R. aquatilis, L. Ell., Salina.
12. R. multifidus, Ph. Law.
13. R. abortivus, L. Law.
14. R. recurvatus, L. Law.: Snow.
15. R. repens, L. Law.: Snow.
16. R. fascicularis, Muhl. Law.: Snow.

Myosurus, Mouse-tail.

17. M. minimus, L. Law., Ell.

Isopyrum, False Rue-Anemone.

18. I. biternatum, T. & G. Law.

Aquilegia, Columbine.

19. A. Canadensis, L. Law., Humboldt.
20. †A. brevistylis. Law.: Snow.

Delphinium, Larkspur.

21. *D. Consolida, L. Law.: Snow.
22. D. tricorne, Mx. Law., Osw.
23. D. virescens, Nutt. Law., Ell. Now considered a variety of D. azureum. Common here, without any variation.

ANONACEÆ.

Asimina, Papaw.

24. A. triloba, Dunal. Law.

MENISPERMACEÆ.

Menispermum, Moonseed.

25. M. Canadense, L. Law., Ell., Osw.

BERBERIDACEÆ.

Podophyllum, May Apple, Mandrake.

26. P. peltatum, L. Law.

NYMPHÆACEÆ.

Nelumbium, Sacred Bean, Water Chinquepin.

27. N. luteum, L. Law. Splendid.

Nuphar, Yellow Pond-Lily.

28. N. advena, Ait. Burlington.

PAPAVERACEÆ.

Sanguinaria, Blood-Root.

29. S. Canadensis, L. Fort Leavenworth: Lieut. Wilcox.

Argemone, Prickly Poppy.

30. A. Mexicana, L. Law.

FUMARIACEÆ.

Dicentra, Eardrop.

31. D. Cucullaria, DC. Law., Osawatomie.

Corydalis.

32. C. flavula, Raf. Law.
33. C. montana, Engelm. Law., Ell., Osw.

CRUCIFERÆ.

Nasturtium, Water Cress.

34. N. obtusum, Nutt. Law.
35. N. limosum, Nutt. Law.
36. N. sessiliflorum, Nutt. Law., Sal.
37. N. palustre, DC. Law.
38. N. sylvestre, R. Br. Law.: Snow. One specimen.
39. N. sinuatum, Nutt. Law., Ell.

Iodanthus, False Rocket.

40. I. hesperidoides, T. and G. Law.

Arabis, Rock Cress.

41. A. dentata, T. and G. Law.: Snow.
42. A. lævigata, DC. Law.
43. A. Canadensis, L., sickle-pod. Law.

Cardamine, Bitter Cress.

44. C. laciniata, Muhl. Law.
45. C. rhomboidea, DC. Osw.

Selenia.

46. †S. aurea. Osw.; very rare.

Barbarea, Winter Cress.

47. B. vulgaris, R. Br. Law.

Erysimum, False Wall Flower.

48. E. cheiranthoides, L. Irving: Mrs. Jewell.
49. E. Arkansanum, Nutt. Ell., Phillips Co.: Popenoe.

Sisymbrium.

50. S. officinale, Scop., hedge mustard. Law.
51. S. canescens, Nutt., tansey mustard. Law.

Sinapis, Mustard.

52. *S. nigra, L., black mustard. Law.; near houses.
53. *S. arvensis, L., charlock. Law.: Snow.
54. *S. alba, L., white mustard. Law.; domestic.

Draba, Whitlow Grass.

55. D. cuneifolia, Nutt, Law.: Snow.
56. D. Caroliniana, Watt. Law., Ell.; has a silique instead of a silicle.

Vesicaria, Bladder Pod.

57. †V. Fendleri. W. Kansas: Popenoe.
58. †V. gracilis. Osw.
58. †V. Ludoviciana, DC. Osw.

Camelina, False Flax.

60. C. sativa, Crantz. Law.: Snow—Topeka: Popenoe.

Capsella.

61. *C. Bursa-pastoris, Moench, shepherd's purse. Law.

Lepidium, Pepper Grass.

62. L. Virginicum, L. Law.
63. L. intermedium, Gr. Law.
64. L. ruderale, L. Law.

Stanleya.

65. †S. pinnatifida, Nutt. Ell.; a fine plant.

CAPPARIDACEÆ.

Cleome, Spider Flower.

66. †C. integrifolia, T. & G. Sal.; also Leavenworth, Lieut. Wilcox, and Topeka, Popenoe.

Polanisia.

67. P. graveolens, Raf. Law.
68. †P. uniglandulosa, DC. Ell., Sal., W. Kan.: Popenoe.

Cristatella.

69. †C. Jamesii, T. & G. Phillips Co.: Popenoe.

VIOLACEÆ.

Viola, Violet.

70. V. delphinifolia, Nutt. Law.
71. V. cucullata, Ait. Law., Ell.
72. V. sagittata, Ait. Law.: Snow; one specimen.
73. V. pubescens, Ait. Law.
— V. pubescens, var. eriocarpa. Osw.
74. †V. Nuttallii, Ph. Ell.

HYPERICACEÆ.

Hypericum, St. John's-wort.

75. H. perforatum, L. Osw.
76. H. corymbosum, Muhl. Law., Osw.
77. H. ellipticum, Hook. Osw., Burl.
78. H. angulosum, Mx. Osage Co.: Snow.

CARYOPHYLLACEÆ.

Saponaria, Soap-wort.

79. S. Vaccaria, L. Topeka; brought by Mr. H. H. Wright.

Silene, Catch-Fly.

80. S. stellata, Ait. Law., Osw.
81. S. antirrhina, L. Law., Sal.

Agrostemma, Corn-cockle.

82. *A. Githago, L. Top.: Popenoe.

Cerastium, Mouse-ear Chickweed.

83. C. viscosum, L. Law.: Snow.
84. C. nutans, Raf. Law.

Arenaria.

85. A. (Alsine) stricta, Mx. Ell.
86. A. (Alsine) patula, Gr. Osw.

Paronychia, Nailwort.

87. †P. Jamesii, T. & G. Ell., Sal., Rooks Co.: Popenoe.
88. P. Canadensis, Wood. Law.
— P. Canadensis, var. pumila (Anychia dichotoma, DC.) Top.: Popenoe.

Mollugo, Carpet-weed.

89. M. verticillata, L. Law., Osw.

PORTULACACEÆ.

Portulaca, Purslane.

90. *P. oleracea, L. Law.

Talinum.

91. †T. parviflorum, Nutt. Law.; might be taken for T. teretifolium, but has only five stamens.

Claytonia, Spring Beauty.

92. C. Virginica, L. Osw.

MALVACEÆ.

Malva, Mallow.

93. *M. rotundifolia, L. Law.
94. *M. crispa, L. Law.; seen once.
95. M. papaver, Cav. Ell.

Callirrhoe.

96. †C. involucrata, Gr. Sal. and Russell Co.: Snow. Is it the same as 95?
97. C. alcæoides, Gr. (Sida of Mx.) Osw., Sal., Burl.

Malvastrum.

98. †M. angustum, Gr. Ell.
99. †M. coccineum, Gr. Ell.; said to be abundant in Cent. and W. Kansas.

Sida.

100. S. spinosa, L. Law., Burl.

Abutilon, Indian Mallow.

101. *A. Avicennæ, Gaertn. Law.

Hibiscus.

102. *H. trionum, L., flower-of-an-hour. Law.
103. H. militaris, Cav. Law.

TILIACEÆ.

Tilia, Linden.

104. T. Americana, L., basswood. Law.

LINACEÆ.

Linum, Flax.

105. L. sulcatum, Riddell. Law., Ell., Osw.
106. †L. rigidum, Ph. Ell., Sal.

ZYGOPHYLLACEÆ.

Kallstræmia.

107. K. maxima, T. & G. (Tribulus, L.) W. Kansas: Popenoe.

GERANIACEÆ.

Geranium, Crane's-bill.

108. G. Carolinianum, L. Law., Burl.
109. G. maculatum, L. Leav.: Prof. Wherrell.

Oxalis, Wood Sorrel.

110. O. violacea, L. Law.
111. O. stricta, L. Law.

Impatiens, Touch-me-not.

112. I. pallida, Nutt. Law.
113. I. fulva, Nutt. Law., Osw.

RUTACEÆ.

Zanthoxylum, Prickly Ash.

114. X. Americanum, Miller. Law., Osw.

Ptelea, Shrub Trefoil.

115. P. trifoliata, L. Anderson Co.: J. M. Welch.

ANACARDIACEÆ.

Rhus, Sumac.

116. R. glabra, L. Law., Ell.
117. R. copallina, L. Law.
118. R. Toxicodendron, L., poison ivy. Law.
119. R. radicans, L., climbing ivy. Law.
120. R. aromatica, Ait., sweet sumac. Law., Ell., Osw.

SAPINDACEÆ.

Acer, Maple.

121. A. dasycarpum, Ehrh., white maple. Law.
122. A. saccharinum, L. Linn and Miami counties.

Negundo, Box Elder.

123. N. aceroides, Mœnch. Law.

Æsculus, Horse Chestnut.

124. A. glabra, Willd., Ohio buckeye. Law.

Staphylea, Bladder Nut.

126. S. trifoliata. L. Law., Irving.

CELASTRACEÆ.

Celastrus, Staff Tree (incorrectly called Bittersweet).

127. C. scandens, L. Law., Sal., Osw.

Euonymus, Burning Bush.

128. E. atropurpureus, Jacq. Law., Osw.

RHAMNACEÆ.

Ceanothus, Jersey Tea.

129. C. Americanus, L. Law.
130. C. ovalis, Bigel. Law., Ell.

Rhamnus, Buckthorn.

131. R. lanceolatus, Ph. Law., Osaw.

VITACEÆ.

Vitis, Grapevine, etc.

132. V. æstivalis, L. Law.; one vine, that was *rust-downy* beneath. Said to be common in S. E. Kansas.
—— var. or sp. cinerea of Engelmann, if I mistake not. Law. and Miami county; very common.
133. V. cordifolia, Mx., frost grape. Law. (See introduction.)
134. V. riparia, Mx. Law., Ell., and Miami county; very common. (See introduction).
135. V. vulpina, L., muscadine grape. Near Baxter Springs: Mr. N. D. Ingraham.
136. V. indivisa, Willd., (Cissus). Law.
137. V. quinquefolia, Lam. (Ampelopsis.) Virginia creeper. Law., Osaw.

POLYGALACEÆ.

Polygala, Milk-wort.

138. P. incarnata, L. Law.
139. P. verticillata, L. Law. Osborne City: Popenoe.
140. P. sanguinea, L. Burl.: from H. H. Wright.
141. †P. alba, Nutt. Ell.

LEGUMINOSÆ.

Schrankia, Sensitive Brier.

142. S. uncinata, Willd. Law.

Desmanthus.

143. D. brachylobus, Benth. Law., Ell., Osw.

Gymnocladus, Coffee Tree.

144. G. Canadensis, Lam. Law.

Gleditschia, Honey Locust.

145. G. triacanthos, L. Law., Osaw.

Cassia, Senna.

146. C. Chamæcrista, L. Law., Osaw.
147. C. nictitans, L. Fort Leavenworth: Lieut. Wilcox.
148. C. Marilandica, L. Law., Osw., Osaw.

Cercis, Red Bud.

149. C. Canadensis, L. Law., Osaw.

Baptisia, Wild Indigo.

150. B. leucophæa, Nutt. Law., Osw.
151. leucantha, T. & G. Law.
152. B. australis, R. Br. Garnett: Snow.

Lathyrus, Sweet Pea, &c.

153. L. linearis, Nutt. Law., Ell.

Vicia, Vetch.

154. V. Americana, Muhl. Law.

Desmodium, Bush Trefoil.

156. D. acuminatum, DC. Law.
157. D. paniculatum, DC. Law., Osw.
158. D. cuspidatum, T. & G. Law.
159. D. canescens, DC. Law.
160. Canadense, DC. Law., Leav. Nearly sessile, a point not noted.
161. D. sessilifolium, T. & G. Law.
162. D. Marilandicum, Nutt. Osw.

163. †D. Illinoiensis, Gr. Law.
164. †D. neglectum, Hall. Law. Mr. Hall thinks it is a species.

Lespedeza, Bush Clover.

165. L. capitata, Mx. Law., Osw.
—— L. capitata, var. angustifolia. Ph., Ell.
166. L. violacea, Pers. Law.
—— L. violacea, var. divergens. Osw.
—— L. violacea, var. sessiliflora. Osw.
167. L. repens, T. & Gr. Law.

Crotalaria, Rattle-pod.

168. C. sagittalis, L. Law.

HOSACKIA.

169. †H. Purshiana, Benth. Sal.

Trifolium, Clover.

170. T. procumbens, L., Yellow Clover. Top.: Popenoe.
171. *T. repens, L., White Clover. Law.
172. T. reflexum, L., Buffalo Clover. Law., Osw.
173. *T. arvense, L. Top.: Popenoe. One specimen.

Melilotus, Sweet Clover.

174. *M. alba, Law. Law., Ell.

PSORALEA.

175. P. floribunda, Nutt. Law., Ell., Osw.
176. †P. argophylla, Ph. Law.; pretty.
177. †P. esculenta, Ph. Law., Ell. Has an eatable tuber.
178. †P. cuspidata, Ph. Ell.
179. †P. digitata, Nutt. Hutchinson: Popenoe.

Amorpha, Lead Plant.

180. A. fruticosa, L. Law., Ell., Osw.
181. A. canescens, Nutt. Law., Osw.

DALEA.

182. D. alopecuroides, Willd. Law.
183. †D. laxiflora, Ph. Ell., Sal. Calyx beautifully fringed.
184. †D. aurea, Nutt. Ell., Sal., Phillips and Rooks Co.: Popenoe.

PETALOSTEMON.

185. P. violaceum, Mx. Law., Ells., Osw,
186. P. candidum, Mx. Law., Osw.
187. †P. multiflorum, Nutt. Law., Ell.; rocky places.
188. †P. villosum, Nutt. Solomon City: Popenoe.

Astragalus, Milk Vetch.

189. A. Canadensis, L. Law., Ells., Osw.
190. A. caryocarpus, Kerr. Law., Ell., Osw., Sal.
191. A. Mexicanus, DC. Law.: Snow.
192. †A. mollissimus, Torr. Ell.
193. †A. racemosus, Ph. Ell.
194. †A. gracilis, Nutt. Ell.
195. †A. lotiflorus, Hook. Ell., Sal.
196. †A. Missouriensis, Nutt. Ell.
197. †A. Shortianus, Nutt. W. Kan.: Popenoe.
198½. †A. bisulcatus, Gr. W. Kan.: Popenoe.
199. †A. pectinatus, Dougl. Ell., Osw.; also, W. Kan.: from Prof. Mudge.

Oxytropis.

200. †O. Lamberti, Ph. Ell., Sal.

Glycyrrhiza, Licorice.

201. †A. lepidota, Nutt. Ell., Law.: Snow. Marshall Co.: W. J. McLaughlin. Pod covered with hooks. Topeka, common: Popenoe.

Sophora.

202. †S. sericea, Ph. Ell., Sal.

Tephrosia, Goat's Rue.

203. T. Virginiana, Pers. Law.

Indigofera, Indigo Plant.

204. I. Caroliniana, Walt. Osw.: Dr. Newlon.

Robinia, Locust.

205. *R. Pseudacacia, L. Law.

Wistaria.

206. W. frutescens, DC. Irving: Mrs. Jewell. Atchison Co.: Miss E. F. Randolph.

Apios, Ground Nut.

207. A. tuberosa, Ph. Law., Osaw.

Phaseolus, Kidney Bean.

208. P. diversifolius, Pers. Law., Osw., Sal.
209. P. pauciflorus, Benth. Law.

Amphicarpæa, Pea-Vine.

210. A monoica, Nutt. Law., Irv.
211. A. Pitcheri, T. & G. Law.

Hoffmanseggia.

212. †H. Jamesii, T. & G. W. Kansas. From Prof. Mudge.

ROSACEÆ.

Prunus, Plum Cherry.

213. P. Virginiana, L., choke cherry. Law., Ell. Irv.
214. P. serotina, Ehr., black cherry. Law.
215. P. Americana, Marsh, wild plum. Law.
216. P. Chicasa, Mx. Ell., Osw.: Dr. Newlon.
217. P. pumila, L. Ell.

Rubus, Bramble.

218. R. villosus, Ait., blackberry. Law.
219. R. Canadensis, L., dewberry. Law., Osw.
220. R. occidentalis, L., black raspberry. Law., Ell.

Geum, Avens.

221. G. album, Gmel. Law.
222. G. Virginianum, L. Law.

Fragaria, Strawberry.

223. †F. Illinoiensis. A species, or a variety of F. Virginiana, L. Law., Osw.

Potentilla, Cinque-foil.

224. P. Norvegica, L. Law.
225. P. Canadensis, L. Law.
—— P. Canadensis, var. recta. Law. Very distinct; a species?
226. P. paradoxa, Nutt. Law.

Agrimonia, Agrimony.

227. A. Eupatoria, L. Law.
228. A. parviflora, Ait. Law.

Rosa, Rose.

229. R. setigera, Mx., prairie rose (Michigan rose?). Law.
230. R. lucida, Ehr., shining rose. Law.
231. R. blanda, Ait., thornless rose. Law., Ell.
232. †R. Arkansana, Porter. Law., Ell.; eight or ten flowers on one stem.

Amelanchier, Service Berry.

233. A. Canadensis, T. & G. Osw.; also Atchison Co., Mrs. Jewell.

Cratægus, Thorn.

234. C. tomentosa, L. Law.
235. C. Oxyacantha, L. Osw.
236. C. Crus-galli, L. Law.

Pyrus, Apple, Pear.

237. P. Ioensis. A species, or a variety of P. coronaria, L., crab-apple; leaves and young twigs very tomentose, fruit sometimes pyriform.
238. P. angustifolia, Ait. Law., Snow.

SAXIFRAGACEÆ.

Heuchera, Alum-root.

239. H. hispida, Ph. Law.: Snow; Leav.: Wherrell.

Ribes, Currant, Gooseberry.

240. R. lacustre, Poir. Law.
241. R. rotundifolium, Mx. Law.
242. R. aureum, Ph., flowering currant. Ell.

CRASSULACEÆ.

Sedom, Stone-crop.

243. S. pulchellum, Mx. Osw.; also Humboldt: Snow.

Penthorum, Virginia Stone-crop.

244. P. sedoides, L. Law., Osw.

HALORAGEÆ.

Myriophyllum, Water Milfoil.

245. M. verticillatum, L. Ell.
246. M. scabratum, Mx. Law., Ell.

LYTHRACEÆ.

Cuphea.

247. C. viscosissima, Jacq. Osaw., Osw.

Lythrum, Loosestrife.

248. L. alatum, Ph. Law., Osw.

Ammania.

249. A. latifolia, L. Law.

—— A. latifolia. Var. pedicellata, pedicels 4 to 6 inches long; leaves narrower and less auriculate. A species?

ONAGRACEÆ.

Jussicœa.

250. J. repens, L. Law.

Œnothera, Evening Primrose.

251. Œ. biennis, L. Law., Ell.
252. Œ. sinuata, L. Law., Osw.
253. Œ. pumila, L. Law., Ell.
254. Œ. linearis, Mx. Black Jack.
255. Œ. Missouriensis, Sims. Law. Flowers very large; capsule-winged.
256. Œ. speciosa, Nutt. Law., Sal. Flowers white, turning red.
257. †Œ. pinnatifida, Nutt. Ell.
258. †Œ. albicaulis, Nutt. Ell.
259. †Œ. triloba, Nutt. Ell. Capsules large, glomerate, woody; plant stemless.
260. †Œ. lavendulæfolia, Gr. Ell.
261. †Œ. rhombipetata. Solomon City: Popenoe.
262. †Œ. serrulata, Nutt. Ell.
263. †Œ. Fremontii. Rooks and Phillips Cos.: Popenoe.

Gaura.

264. G. biennis, L. Law., Osw.
265. G. mollis, Nutt. Law.
266. †G. parviflora, Doug. Ell., Rooks Co.: Popenoe.
267. †G. coccinea, Nutt. Ell.

Stenosiphon.

268. †S. virgatus, Spach. Law., Ell., Irv.

Ludwigia, Bastard Loose-Strife.

269. L. alternifolia, L. Osw.; also, Leavenworth: Wherrell.
270. L. alata, Ell. Law.
271. L. palustris, Ell. Law.

Circœa, Enchanter's Nightshade.

272. C. Lutetiana, L. Law.

LOASACEÆ.

Mentzelia.

273. M. oligosperma, Nutt. Law., Ell.
274. †M. ornata. W. Kansas: from Prof. Mudge.

PASSIFLORACEÆ.

Passiflora, Passion Flower.

275. P. lutea, L. Osw.

CUCURBITACEÆ.

Echinocystis, Prickly Cucumber.

276. E. lobata, T. & G. Law.

Sicyos, Single-seeded Cucumber.

277. S. angulatus, L. Law.

Cucerbita, Pumpkin, etc.

278. C. perennis, Gr. Law., one place, Sal.

CACTACEÆ.

Opuntia, Indian Fig.

279. O. vulgaris, Mill. Law., Osaw.
280. O. Rafinesquii, Eng. Law., Ell.
281. O. Missouriensis, DC. Law., Ell.

Mamillaria.

282. †M. vivipara, Haw. Ell.
283. †M. Nuttallii, var. cæspitosa, Eng. Ell.

UMBELLIFERÆ.

Sanicula, Sanicle.

284. S. Marilandica, L. Law., Ell., Sal.
285. S. Canadensis, L. Ell.

Eryngium.

286. E. yuccæfolium, Mx. Law., Osaw. Pretends to be an endogen.
287. †E. Leavenworthii, T. & G. Burl. and Franklin county; taken for a teasel.

Polytœnia.

288. P. Nuttallii, DC. Law.

Peucedanum, Parsnip, etc.

289. P. sativum, Wood (Pastinaca, L.), parsnip. Law.
290. †P. fœniculaceum, Nutt. Law., Sal., Osw.; very early and common.
291. †P. nudicaule, Nutt. Ell., Sal.

Osmorrhiza.

292. O. longistylis, DC., sweet cicely. Osw.
293. O. brevistylis, DC. Law.

Chærophyllum, Chervil.

294. C. procumbens, Lam. Law.
295. C. Tainturieri, Hook. and Arn. Law.: Snow.

Cryptotœnia, Honeywort.

296. C. Canadensis, DC. Law.

Carum, Caraway, etc.

297. C. aureum, Wood (Thaspium, Nutt.), Golden Alexanders. Law.

Pimpinella, Anise.

298. P. integerima, B. & H. (Zizia, DC.) Law.; one place.

Æthusa, Fools' Parsley.

299. Æ. Cynapium, L. Law.: Snow.

Sium.

300. S. lineare, Mx. Law.
301. †S. angustifolium, L. Ell.

Cicuta, Water Hemlock.

302. C. maculata, L. Law.

Leptocaulis.

303. †L. echinaceus, Nutt. Ell.

Discopleura, Bishop's Weed.

304. D. capillacea, DC. Wabaunsee: from Mrs. S. M. Thomas.
305. D. Nuttallii, DC. Osw.

CORNACEÆ.

Cornus, Dogwood.

306. C. asperifolia, Mx. Law., Osw.
307. C. circinnata, L. Law., Osw.
308. C. paniculata, L'Her. Law.
309. †C. pubescens, Nutt. Law., Ell., Osw.

CAPRIFOLIACEÆ.

Triosteum, Feverwort.

310. T. perfoliatum, L. Law Osw.

Symphoricarpus, Snowberry.

311. S. vulgaris, Mx Law., Osw.
312. S. occidentalis, R. Br. Ell., W. K.: Popenoe.

Sambucus, Elder.

313. S. Canadensis, L. Law.

Viburnum, Snowball, &c.

314. V. Lentago, L., sweet viburnum. Law.: Snow.
315. V. prunifolium, L., black haw. Osw.

RUBIACEÆ.

Galium, Bedstraw

316. G. circæzans, Mx. Law., Sal., Irv., Top.: Popenoe.
317. G. triflorum, Mx. Law.
318. G. trifidum, L. Law.
319. G. tinctorium, Torr. Law.
320. G. concinnum, Torr. Law.: Snow.
321. G. Aparine, L. Law., Ell.
322. †G. asperrimum, Gr. Ell.

Houstonia, Bluets.

324. H. minima, Beck. Law.
325. H. purpurea, L. Law.
326. H. angustifolia, Mx. Ell., Sal., Irv.
327. H. tenuifolia, Nutt. Sal., Irv.

Cephalanthus, Button-Bush.

328. C. occidentalis, L. Law., Sal.

VALERIANACEÆ.

Fedia (*Valerianella*).

329. †F. Stenocarpa. Osw.

COMPOSITÆ.

Vernonia, Iron Wood.

330. V. fasciculata, Mx. Law.
331. V. ovallifolia, T. & G. Law. Common.
332. †V. Arkansana. E. Kansas. Hall.

Elephantopus, Elephant's Foot.

333. E. Carolinianus, Willd. Osw.
334. E. tomentosus, L. Osw.

Liatris, Button Snake-root.

335. L. squarrosa, Willd. Blazing Star. Law., Sal., Osw.
336. L. cylindracea, L. Law.: Saunders.
337. †L. punctata, Hook. Law., Ell. Sandy spots.
—— L. punctata, var. bracteosa, with long bracts among the heads.
338. L. pycnostachya, M Law., Osw.
339. L. scariosa, L. Gay feather. Law., Sal., Osw. All the species prairie plants.

Kuhnia.

340. K. eupatorioides. L. Law, Osw. Common.
341. †K. gracilis, T & G. Ell. Given in Porter and Coulter as a variety, but strikingly different. Both forms have the involucre striated like Brickellia—a point not mentioned in Wood nor Gray.

Brickellia.

342. B. cordifolia, Ell. Law. Two specimens.
343. †B. grandiflora, Nutt. Ellis.

Eupatorium, Boneset, &c.

344. E. ivæfolium, L. Sal., Ell.
345. E. purpureum, L. Law.
346. E. parviflorum. Ell., Osw., Irv., Burl.
347. E. altissimum, L. Law.
348. E. perfoliatum, L. Boneset. Law.; two places.
349. E. ageratoides, L. Law., Sal., Osw.

Aster.

350. A. paludosus, L. Osw.
351. A. sagittifolius, Willd. Law.: Sanders.
352. A. undulatus, L. Law., Osw. Has the sharp tooth of A. cordifolius, and the loose scales of A. sagittifolius.
353. A. azureus Ludl. Law., Osw.
354. A. sericeus, Vent. Law.
355. A. lævis, L. Law.
—— A. lævis. Var. lævigatus. Osw.
356. A. patens, L. Osw.
357. A. Novæ-Angliæ, L. Law.
358. A. puniceus, L., var. vimineus. Law.
359. A. carneus, L. Law., Osw.
360. A. virgatus. Ell., Osw.
361. A. Novi-Belgii, L. Law.
362. A. oblongifolius, Nutt. Law.
363. A. Tradescanti, L. Law.: Snow. Ell.
364. A. miser, Ait. Law.
365. A. simplex, Willd. Law., Osw.
366. A. tenuifolius, L. Law.
367. A. ericoides, L. Osw.
368. A. multiflorus, T. & G. Law., Ell., Osw.
—— A. multiflorus. A var. with flowers only terminal.
369. †A. Nuttallii, T. & G. (Fendleri). Ellis, Burl. Popenoe.

Townsendia.

370. †T. sericea, Hook. Ellis.

Machæranthera.

371. †M. tanacetifolia, Nees. Ellis.

Diplopappus, Double-bristled Aster.

372. †D. ericoides, T. & G. Ellis.

Erigeron Fleabane.

373. E. Canadense, L. Law.
374. E. divaricatum, Mx. Law.
376. E. bellidifolium, Muhl. Law.
377. E. Philadelphicum, L. Law.
378. E. annuum, Pers. Law., Irv.
379. E. strigosum, L. Law.
—— E. strigosum, var. integrifolium. Osw.

Boltonia.

380. B. glastifolia, L'Her. Law., Osw.

Gutierrezia.

381. +G. Euthamiæ, T. & G. Ellis.

Amphiathyris.

382. †A. dracunculoides, DC. Paola, S. Kansas: Hall.

—— †A. dracunculoides, var. with branches irregular—not umbel-like. Osw.

Solidago, Golden Rod.

383. S. squarrosa, Muhl. Osw.

384. S. petiolaris, Ait. Law.

—— S. petiolaris, var. suaveolens. Law. A species?

385. S. Virga-aurea, L. Rooks Co.: Popenoe.

386. S. speciosa, Nutt. Law.; variable.

387. S. puberula, Nutt. Law.: Snow.

388. S. Missouriensis, Nutt. Law., Osw.

389. S. giganteus, Ait. Law., Ell.

390. S. Canadensis, L. Law.

391. S. ulmifolia, Muhl. Law.

392. S. rigida, L. Law., Ell., Osw.

393. †S. asperrima. Ellis.

394. S. lanceolata, Ait. Law., Irv.

395. S. tenuifolia, Ph. Law., Irv.

Aplopappus (*Prionopsis*).

396. †A. spinulosus, D. C. Ellis, Sal.

397. †A. ciliatus. Law., Ell., Sal.

Grindelia.

398. †G. squarrosa, Dunal. Law.

399. †G. lanceolata. Osw., Law.; once.

Heterotheca.

400. H. scabra, DC. Law., Ell.

Chrysopsis.

401. C. villosa, Ph. Ellis, W. Kan.: Popenoe.

—— C. villosa, var. hispida. Ell.

Diaperia.

402. †D. prolifera, Nutt. Ell.

Polymnia, Leaf Cup.

404. P. Uvedalia, L. Osw.

Eclipta.

405. E. alba, L. Law.

Silphium, Resin Wood, etc.

406. S. laciniatum, L., polar plant. Law.

407. S. integrifolium, Mx. Law.

408. S. lævigatum. Ell., Law.

409. †S. asperrimum. Law.: Snow.

410. S. perfoliatum, L., cup plant. Law.

Parthenium.

411. P. integrifolium, L. Law.; seen once.

Iva, Marsh Elder.

412. I. ciliata, Willd. Law.

413. †I. xanthiifolia, Ar. Ellis.

Ambrosia, Hogweed, etc.

414. A. trifida, L. Law.; leaves sometimes 5-tubed.

415. A. artemisiæfolia, L., hog-weed or Roman wormwood. Law.

416. A. psilostachya, DC. Ellis, Osw.

417. A. bidentata, Mx. Osw.

Xanthium, Clot-bur.

418. X. strumarium, L. Law.

Heliopsis, Ox-eye.

419. H. lævis, Pers. Law.; rare.

—— H. lævis, var. scabra. Law.; common.

Echinacea, Purple Cone-flower.

420. E. purpurea, Moench. Miami Co.

421. E. angustifolia, DC. Law.

422. †E. atrorubens, Nutt. Law.

Rudbeckia, Cone-flower.

423. R. laciniata, L. Law., Irv.

424. R. subtomentosa, Ph. Law.

425. R. triloba, L. Law.

426. R. hirta, L. Law.: Snow.

Dracopsis.

427. †D. amplexicaulis, Cass. Osw.

Lepachys.

428. L. pinnata, T. & G. Law., Osw., Irv.

429. †L. columnaris, Wood. Ellis, Irv.

—— L. columnaris, var. pulcherrima. Law.: Saunders.

Helianthus, Sunflower.

430. H. rigidus, Desf. Law.

431. H. atrorubens, L. Law.

432. †H. petiolaris, Nutt. Ellis.

433. †H. lenticularis, Dougl. Law.; very common.

434. †H. orgyalis, DC. Paola, Osw.; lately come to Law.; rocky places; leaves long and narrow.

435. †H. Maximiliani. Law.; allied to H. giganteus.

436. H. tomentosus, Mx. Law.

437. H. grosse-serratus, Martins. Law.; common.

438. H. tuberosus, L. Law.; see introduction.

439. H. lætiflorus, Pers. Law.

440. H. mollis, Lam. Law., Osw.

441. H. decapetalus, L. Law., Ell.

442. H. tracheliifolius, Willd. Law., Osw. Have observed that this species and others which have leaves alternate above, have them all opposite, if they grow only about half the usual height.

443. H. doronicoides, Lam. Law. (See introduction.)

444. H. strumosus, L. Law.

445. H. hirsutus, Raf. Law., Osw. Two more forms that appear distinct with very scabrous, roundish leaves.

Actinomeris.

446. A. helianthoides, Nutt. Osw., Irv.

447. A. squarrosa, Nutt. Law., Osw.

Thelesperma.

448. †T. gracile, Gr. Hutchinson: Popenoe.

Coreopsis, Tick-seed.

449. C. tinctoria, Nutt. S. Kan: Hall.

450. C. palmata, Nutt. Law.

451. C. delphinifolia, Lam. Law.

452. C. aristosa, Mx. (involucrata, Nutt.) Law.; common.

453. †C. cardaminifolia, DC. Osw., Sal.

Bidens, Bur Marigold.

454. B. bipinnata, L. Spanish Needles. Osw.

455. B. frondosa, L. Beggarticks, Cuckold. Law.

456. B. connata, Willd. Law.

457. B. cernua, L. Law.

458. B. chrysanthemoides, L. Law.

Verbesina, Crown-Beard.

459. V. Virginica, L. Law., Osw.

460. V. sinuata, Ell. Osw.

Dysodia, False Dog-fennel.

461. *D. chrysanthemoides, Lagasca. Law.; streets.

Gaillardia.

462. G. lanceolata, Mx. Solomon City: Popenoe.

463. G. pulchella, Doug. Ellis, Dogde: Popenoe.

Bahia.

464. †B. —— New species, so Mr. Wood thinks. Ellis. Much like Matricaria.

Actinella.

465. †A. acaulis, L. Dodge: Popenoe.
466. †A. scaposa, Nutt. Ellis: L'Her.

Hymenopappus.

467. H. scabiosæus. Clay Co.: Popenoe.
468. †H. tenuifolius, Ph. Ellis, Sal.

Helenium.

469. H. autumnale, L. Law.
470. H. tenuifolium, Nutt. Osw.
471. H. quadridentatum, Labill. Law., Osw.
472. †H. tanacetifolium. W. Kansas: Popenoe.

Anthemis, Camomile, etc.

473. *A. cotula, L., Mayweed. Law., streets.

Achillea, Yarrow.

474. A. millefolium, L. Law.

Artemisia, Wormwood.

475. A. frigida, Nutt. W. Kan.: Popenoe.
476. A. Ludoviciana, Nutt. Law.
477. A. vulgaris, L. Law., Ell.
478. A. biennis, Willd. Law., Irv.
479. †A. dracunculoides, Ph. Law., Ellis, Sal.
480. †A. filiformis, Torr. Ellis.
481. †A. Carruthii, sic vult Mr. Wood, nov. sp. Erect, simple, clothed all over in a white tomentum. Leaves pinnately parted, with linear segments, the lower bipinnately, with leafy axillary tufts, all close-pressed, 1′ and less long. Heads oblong, small, 1″, 7-lined flowered, homogamous, all condensed in a narrow, spike-like panicle. Plant, 1–2 feet.

Gnaphalium, Cudweed.

482. G. polycephalum, Mx. Osw., Law.: Snow.

Antennaria, Everlasting.

483. A. dioica, Gaert., mouse-ear everlasting (plantaginifolia). Law.

Erechthites, Fire-Weed.

484. E. hieracifolius, Raf. Law.

Cacalia, Tassel-Flower, etc.

485. C. atriplicifolia, L. Law.
486. C. tuberosa, Nutt. Law.

Senecio, Groundsel.

488. S. aureus, L. Law., Ell.
489. S. anonymus, Wood. Ellis.
490. †S. longilobus, Benth. Ellis.
491. S. lobatus, Pers. Osw.

Cirsium, Thistle.

492. C. undulatum, Spr. Ellis, W. Kan.: Popenoe.
493. C. altissimum, Spr. Law., Irv.
494. C. Pitcheri, T. & G. Irv.
495. C. Virginanum, Mx. Law.

Lappa, Burdock.

496. *L. major, Gaert. Law.

Krigia, Dwarf Dandelion.

497. K. Virginica, Willd. Law.: Snow. One specimen. Top.: Popenoe. Think I have seen it.

Cynthia.

498. C. Dandelion, DC. Osw.

Hieracium, Hawkweed.

499. H. longipilum, Torr. Law., Osw.
500. H. Gronovii, L. Law.: Snow.
501. H. paniculatum, L. Law.: Snow.

Nabalus, Drop-Flower.

502. N. asper, T. & G. Law., Osw.
503. N. racemosus, Hook. Law.

Lygodesmia.

504. †L. juncea, Don. Sal., W. Kan.: Popenoe.

Troximon.

505. T. cuspidatum, Nutt. Law.

Taraxacum, Dandelion.

506. *T. Dens-leonis, Less. Law.

Lactuca, Lettuce.

507. L. Canadensis, L., (elongata.) Law. Very variable.

Mulgedium.

508. M. pulchellum, Nutt. W. Kan.: Popenoe.

Sonchus, Sow Thistle.

509. S. asper, Vill. Law. Variable.

Engelmannia.

510. †E. pinnatifida, T. & G. Russell Co.: Popenoe. Should be after Silphium.

LOBELIACEÆ.

Lobelia.

511. L. cardinalis, L. Osaw., Ell. Rare.
512. L. syphilitica, L. Law., Osw. Teeth of L. glandulosa.
513. L. leptostachys, A. DC. Law., Osw.
514. L. spicata, Lam. Top: Popenoe. Rare.

CAMPANULACEÆ.

Campanula.

515. C. Americana, L. Law., Osw.

Specularia.

516. S. perfoliata, Lam. Law., Ell., Osw.
517. †S. leptocarpa, Nutt. Ell., Osw., Law.: Snow. Riley Co.: Popenoe.

ERICACEÆ.

Gay-Lussacia, Huckleberry.

518. G. resinosa, T. & G. Baxter Springs: Mr. N.D. Ingraham, nurseryman.

Monotropa, Indian Pipe.

519. M. uniflora, L. Vinland, Douglas Co.: Miss S. Cutter.

AQUIFOLIACEÆ.

Prinos, Winterberry.

520. P. glaber, Gray. Osw.

EBENACEÆ.

Diospyros, Persimmon.

521. D. Virginiana, L. Law., Osw.

PRIMULACEÆ.

Androsace.

522. A. occidentalis, Ph. Law., Ell.
523. A. filiformis, Retz. Ell.

Lysimachia, Loosestrife.

524. L. hybrida, Mx. Law., Osw.
525. L. ciliata, L. Law., Osw.

PLANTAGINACEÆ.

Plantago, Plantain.

526. *P. major, L. Law.
527. P. lanceolata, L. Law.; one place.
528. P. aristata, Mx. Law.
529. P. Virginica, L. Law.
530. P. gnaphalioides, Gr. Ell.
531. P. pusilla, Nutt. Ell., Sal.

LENTIBULACEÆ.

Utricularia, Bladderwort.

632. U. vulgaris, L. Law., Ell.

OROBANCHACEÆ.

Aphyllon, Naked Broom-rape.

633. A. uniflora. T & G. Law.: Snow.

634. A. fasciculata, T. & G. Irv.: Mrs. Jewell.

Phelipea, Broom-rape.

635. P. Ludoviciana, Don. Law. One plant; Burlington. Also from Marshall county to Prof. Snow, by W. J. McLaughlin.

PEDALIACEÆ.

Martynia, Unicorn Plant.

636. M. proboscidea, Glox. Law. Near gardens.

SCROPHULARIACEÆ.

Verbascum, Mullein.

637. *V. Thapsus, L. Law.

638. *V. blattaria, L. Law. One plant.

Linaria, Toad-flax.

639. *L. vulgaris, Mill. Law. Near a garden.

Scrophularia, Figwort.

640. S. nodosa, L. Law.

Pentstemon, Beard-tongue.

641. P. grandiflorus, Fras. Russell county: Snow; Law.: Sanders.

642. P. pubescens, Soland. Law.

643. P gracilis. Nutt. Law., Osw., Burl.

644. †P cobæa, Nutt. Law. Fine.

645. †P. albidus, Nutt. Ell.

646. ‡P. tubiflorus. Law.: Snow.

Collinsia, Innocence.

647. C. verna, Nutt. Osw.

Mimulus, Monkey-flower.

648. M. ringens, L. Law.: Snow.

649. M. alatus, Ait. Law., Osw.

650. M. Jamesii, Torr. Ell., Irv. "The hands are Esau's, but the voice is Jacob's." Leaves agree with M. Jamesii; the flowers with M. robellus. Quite a mimic.

Conobea.

651. C. multifida, Benth. Law., Osaw., Osw.

Herpestis.

652. H. rotundifolia, Ph. Law. Flowers white.

Ilysanthus.

653. I. gratioloides, Benth. Law.

Veronica.

654. V. Virginica, L. Culver's Physic. Law.

655. V. Americana, Schw. Irv.: Mrs. Jewell.

656. V. peregrina, L. Law., Ell.

657. V. anagallis, L. Irv.

Buchnera, Blue-hearts.

658. B. Americana, L. Law., Osw., Burl.

659. †B. elongata, Swz. Osw.

Seymeria.

660. S. macrophylla, Nutt. Near Baldwin.

Gerardia.

661. G. auriculata, Mx. Law., Osw., Top.: Popenoe.

662. G. aspera, Doug. Law., Salina, Osw.

663. G. purpurea, L. Law., Ell., Sal., Osw.

664. G. tenuifolia, Vahl. Law., Burl.

Castilleia, Painted Cup.

665. C. sessiliflora, Ph. Ell., Salina.

Pedicularis, Lousewort.

666. P. Canadensis, L. Law.

ACANTHACEÆ.

Ruellia.

667. R. strepens, Nees. Law., Osw.

668. R. ciliosa, Nees. Law., Sal., Osw., Irv.

Dicliptera.

669. D. brachiata, Spr. Law., Osw.

Dianthera.

670. D. Americana, L. Law., Burl.

VERBENACEÆ.

Verbena, Vervain.

671. V. angustifolia, Mx. Law., Osw.

672. V. hastata, L. Law., Osw.

673. V. urticæfolia, L. Law.

674. V. stricta, Vent. Law.

675. V. bracteosa, Mx. Law., Ell.

676. V. spuria, L. Law.; one place.

677. V. Aubletia, L. Law.

Lippia, Fog-fruit.

678. L. lanceolata, Ph. (nodiflora). Law., Ell., Osw.

679. †L. cuneifolia, T. & G. Ell.

Phryma, Lopseed.

680. P. leptostachya, L. Law., Osw.

LABIATÆ.

Teucrium, Germander.

681. T. Canadense, L. Law., Ell., Osw.

—— T. Canadense, var. bracteosa. Law.

Isanthus, False Pennyroyal.

682. L. cæruleus, Mx. Law.

Mentha, Mint.

683. M. Canadensis, L. Law.

Lycopus, Water Hoarhound.

684. L. Europæus, L. Law., Osw.

685. L. Virginicus, L. Irv.: Mrs. Jewell.

Hedeoma, Pennyroyal.

686. H. hispida, Ph. Law., Ell.

687. †H. Drummondi, Benth. Ell., Osborne: Popenoe.

Pycnanthemum, Basil.

688. P. pilosum, Nutt. Law.

689. P. lanceolatum, Ph. Law.

690. P. linifolium, Ph. Law., Osw.

Salvia, Sage.

691. †S. Pitcheri, Torr. Law., Ell., Osw.

692. †S. lanceolata, Willd. (trichostemmoides). Law., Ell.

Monarda, Mountain Mint.

693. M. fistulosa, L. Law.

694. M. Bradburiana, Nutt. W. Kan.: Popenoe.

695. M. punctata, L. Osw.

696. †M. aristata, Nutt. Cloud Co.: Popenoe.

Blephilia.

697. B. ciliata, Raf. Baldwin.

698. B. hirsuta, Benth. Baldwin.

Lophanthus, Hedge Hyssop.

699. L. nepetoides, Benth. Law., Osw.

Nepeta.

700. *N. Cataria, L., catmint. Law.

701. *N. Glechoma, Benth., gill-over-the-ground. Law.

Brunella, Self-heal.

702. B. vulgaris, L. Law., Osw.

Scutellaria, Scullcap.

603. S. lateriflora, L. Marshall Co.: to Prof. Snow by Mrs. S. D. Mauk.
604. S. parvula, Mx. Law.
605. †S. Wrightii, Gr. Ell., Osborne: Popenoe.

Physostegia, Lion Heart.

606. P. Virginiana, Benth. Law.

Stachys, Hedge Nettle.

607. S. glabra, Riddell. Law., Irv.
608. S. palustris, L. Law.
609. S. sylvatica, Nutt. Law.: Snow; one specimen.

Leonurus, Motherwort.

610. *L. Cardiacus, L. Law.

Marrubium, Hoarhound.

611. *M. vulgare, L. Law., Osw.

BORRAGINACEÆ.

Onosmodium.

612. O. Virginicum, Alph. DeC. Law., Ell.
613. O. Carolinianum, DC. Law.
614. O. molle, Mx. Law., common. Osw.

Lithospermum, Gromwell.

615. L. angustifolium, Mx. Law., Ell.
616. L. canescens, Lehm. Puccoon, Indian paint. Law.
617. L. hirtum, Lehm. Law.: Snow.
618. L. longiflorum, Spreng. Law., Ell. Because an intermediate has been found between Nos. 615 and 618, it is proposed to regard them as one species. Was it ever known that a species varied in its blossoms from white to yellow. or v. v.?

Echinospermum.

619. E. lappula, Lehm. Ell., Law.: Snow. Irv.: Mrs. Jewell.
620. †E. Redowskii, Lehm. Ell.

Cynoglossum, Hound's Tongue.

621. *C. officinale, L. Law. One place.
622. C. Morrisoni, DC., beggar-ticks. Law.

Eritrichium.

623. †E. crassisepalum, Torr. Ell.

HYDROPHYLLACEÆ.

Hydrophyllum, Water Leaf.

624. H. Virginicum, L. Law.

Ellisia.

625. E. Nyctelea, L. Law., Ell., Osw.
E. Nyctelea. Dwarf specimens, two inches high. Ell.

Phacelia.

626. †P. —— Species under consideration.

POLEMONIACEÆ.

Phlox.

627. P. pilosa, L. Law., Osaw.
628. P. divaricata, L., var. Laphamii. Law., Osw.
629. P. Carolina, L. Irv.: Mrs. Jewell.

Polemonium.

630. P. reptans, L., Jacob's ladder. Reported to Prof. Snow.

CONVOLVULACEÆ.

Quamoclit, Cypress Vine.

631. Q. coccinea, Mœnch. Law.

Pharbitis, Morning-Glory.

632. *P. purpurea, Lam. Purple morning-glory. Law.
633. *P. Nil, Chois. Blue morning-glory. Law.

Ipomœa.

634. I. lacunosa. L. Law.
635. I. pandurata. Meyer, wild potato. Law., Osw.
636. †I. leptophylla, Torr. Ell., Sal.

Convolvulus, Bind-Weed.

637. C. arvensis, L. Top.: Popenoe.

Calystegia.

638. C. spithamæa, Br. Law., Ell.
639. C. sepium, Br. Law.
640. C. Catesbiana, Ph. Rll.. Irv.

Bonamnia, (Stylisma.)

641. †B. Pickeringii. Solomon City: Popenoe.

Evolvulus.

642. †E. argenteus, Ph. Ell.

Cuscuta, Dodder.

643. C. glomerata, Chois. Law.; common.
644. C. compacta, Juss. Law.: Snow.
645. C. tenuiflora, Eng. Ell., Irv., Law.: Saunders.
646. C. decora, Chois. Law.: Snow.
647. C. chlorocarpa, Eng. Law.; one place.
648. C. arvensis, Eng., var. pentagona. Irv.
649. C. Gronovii, Willd. Law.

SOLANACEÆ.

Solanum, Potato, etc.

650. S. nigrum, L., black nightshade. Law.
651. S. Carolinense, L., horse nettle. Law., Sal.
652. S. Dulcamara, L., bitter-sweet. Osw.: Dr. Newlon. Atchison county: Miss Randolph.
653. *†S. rostratum, Dun. Law., Osw.

Physalis, Ground Cherry.

654. P. viscosa, L. Law. Annual.
655. P. nyctaginea, Dun. Law., Sal. Annual.
656. P. Pennsylvanica, L. Law., Sal., Osw. Perennial.
657. P. lanecolata, Mx. Law., Sal. Perennial.
658. P. Philadelphica. Law., Top.: Popenoe. Annual.
659. P. pubescens, L. Law. Perennial.
660. †P. rhomboidea, C. Law., Sal. Perennial.
661. †P. mollis. Phillips Co.: Popenoe. For remarks on the Physalids, see introduction.

Withania.

662. *W. sordida. Ellis.

Datura, Jimson-weed.

663. *D. stramonium, L. Law.

GENTIANACEÆ.

Sabbatia, American Century.

664. S. gracilis, Salisb., or S. stellaris, Ph., or both. Osw. Pretty.

Gentiana, Gentian.

665. G. alba, Muhl. Law.
666. G. Andrewsii, Griseb. Law.
667. G. Saponaria, L. Law.
668. G. puberula, Mx. Law.

APOCYNACEÆ.

Apocynum, Dogbane, etc.

669. A. androsæmifolium, L. Ell., Osw.
670. A. cannabinum, L. Law.

ASCLEPIADACEÆ.

Asclepias, Milkweed.

671. A. Cornuti, Decaisne. Law.
672. A. Sullivantii, Eng. Law.
673. A. purpurascens, L. Law., Sal., Osw.

674. *A. ovalifolia, Decaisne (Vaseyi, T. & G.) Law., Ell., Sal.
675. *A. obtusifolia, Mx. Law.
676. A. speciosa, Torr. Hutchinson: Popenoe.
677. A. Jamesii, Torr. Extreme W. Kas.: Popenoe.
678. A. Meadii, Torr. Law.: Snow. In 1873, I found several specimens agreeing nearly with A. Meadii, but they had *umbels nodding*. Have looked in vain for them each year since.
679. A. incarnata, L. Law., Irv.
680. A. tuberosa, L. Law.
681. A. verticillata, Ell. Law., Ell., Osw.

Acerates, Hornless Milkweed.

682. A. viridiflora, Ell. Law., Ell., Sal.
683. A. monocephala, Lapham. (A. lanuginosa.) Law.: Snow. Topeka: Popenoe.
684. A. longifolia, Ell. Law., Sal.
685. †A. angustifolia, Decaisne. Law., Ell.
686. A. paniculata, Nutt. Law., Sal.
687. †A. auriculata, Eng. Ell.
688. A. ———. Stem simple, one foot; leaves petiolate, lanceolate, obtuse, 2′ by ½′; umbel terminal sessile; flowers like A. paniculata. Ell.

Enslenia.

689. E. albida, Nutt. Law., Irv.

OLEACEÆ.

Fraxinus, Ash.

690. F. Americana, L. White Ash. Law.
691. F. viridis, Mx. Green Ash. Law., Osw.

ARISTOLOCHIACEÆ.

Aristolochia, Birthwort.

692. A. Sipho, L., Her. Osw.

NYCTAGINACEÆ.

Oxybaphus.

693. O. nyctagineus, Sweet. Law., Osw.
694. O. angustifolius, Sweet. Law., Sal.
695. O. linearis, Ph. Law., Ell., Burl. I find no intermediates between the last two.
696. O. albidus, Sweet. Law.: Snow.

POLYGONACEÆ.

Eriogonum.

697. †E. annuum, Nutt. Ell.; also, W. Kansas: Popenoe.

Rumex, Dock Sorrel.

698. *R. crispus, L. Yellow Dock. Law.
699. R. altissimus, Wood. Peach-leaved Dock. Law.
700. R. verticillatus, L. Irv.: Mrs. Jewell.
701. *R. acetosella, L. Sheep Sorrel. Law.
702. †R. venosus, Ph. Ell.

Polygonum, Knot Grass, etc.

703. *P. aviculare, L., knot grass. Law., Ell.
704. P. erectum, L. Law.
705. P. tenue, Mx. Law.
706. P. maritimum, L. Law.
707. P. ramosissimum, Mx. Law., Osw.
708. P. hydropiperoides, Mx., mild water-pepper. Law.
709. P. acre, H. B. K., water smartweed. Law.
710. P. Hydropiper, L., water-pepper. Law.
711. P. Persicaria, L., lady's thumb. Law.
712. P. Pennsylvanicum, L. Law., Ell.
713. P. incarnatum, Ell. Law.
— P. incarnatum, var. with seeds in shape of a quarter of an apple, with the core cut out. Law.
714. P. amphibium, L. Law., Osw.
715. P. Virginicum, L. Law., Osw.
716. P. Convolvulus, L., knot bind-weed. Law., Ell.
717. P. dumetorum, L., hedge bind-weed. Law., Ell., Osw.

PHYTOLACCACEÆ.

Phytolacca, Poke.

718. P. decandra, L. Law.

CHENOPODIACEÆ.

Cycloloma.

719. C. platyphyllum, Moquin. Law., S. W. Kansas.

Chenopodium, Pigweed, etc.

720. C. hybridum, L. Law.
721. C. Boscianum, Gr. Law.
722. C. album, L., pigweed. Law.
723. C. ambrosioides, L., Mexican tea. Law.
724. C. anthelminticum, Gr., wormseed. Osw.

AMARANTACEÆ.

Amarantus, Amaranth.

725. A. paniculatus, L. Law.
726. A. retroflexus, L. Law.
— A. retroflexus, var. giganteus. Law.
727. A. chlorostachys, Willd. Law.
728. A. hybridus, L. Law..
729. A. albus, L. Law.
730. A. blitum. Law.; see introduction.

Amblogyne.

731. †A. Torreyi, Gr. Law.

Monielia.

732. M. tamariscina, Gr. Law.

Frœlichia.

733. F. floridana, Moq. Osw.; also from Wabaunsee: Mrs. S. M. Thomas. Solomon City: Popenoe.

LAURACEÆ.

Sassafras, Sassafras.

734. S. officinale, Nees. Cherokee Co.; from Mr. T. E. Barnard.

Benzoin, Spice Bush.

735. B. odoriferum, Nees. Osw.

LORANTHACEÆ.

Phoradendron, Mistletoe.

736. P. flavescens, Nutt. Osw.: Dr. Newlon.

SANTALACEÆ.

Comandra, Bastard Toad-flax.

737. C. umbellata, Nutt. Law.

EUPHORBIACEÆ.

Euphorbia, Spurge.

738. E. marginata, Ph. Law., Ell.
739. E. corollata, L. Law.
740. E. Curtisii, Eng. Law., Ell., Osw.
741. E. dictyosperma, Eng. Law., Sal.
742. E. obtusata, Ph. Law., Irv.
743. E. heterophylla, Mx. Law.
744. E. dentata, Mx. Law., Ell., Sal.
745. E. hypericifolia, L. Law., Osw.
746. E. glyptosperma, Eng. Law., Osw., Phillips Co.: Popenoe.
747. E. maculata, L. Law.
748. E. humistrata, Eng. Law.

749. E. cordifolia, Ell. Law.
750. E. serpens, H. B. K. Law.
751. †E. hexagona, Nutt. Law., Ell., Top.: Popenoe.
752. †E.———. Seed oblong, junk-bottleate at one end. Osw.

Tragia.

753. T. urticæfolia, Mx. Law., Sal.
754. †T. ramosa, Tarr. Osborne City: Popenoe.

Acalypha, Three-seed Mercury.

755. A. Virginica, L. Law.
756. A. gracilens, Gr. Law., Osw. The two appear quite distinct.

Croton.

757. C. monanthogynus, Mx. Law., Ells., Osw.
758. C. capitatus, Mx. Law., Osw., Irv.
759. †C. Texensis, Müll. (C. muricatus, Nutt.) Ell., Russell Co.: Popenoe.

URTICACEÆ.

Ulmus, Elm.

760. U. Americana, L. White Elm. Law.
761. U. fulva, Mich. Slippery Elm. Law.

Celtis, Hackberry.

762. C. occidentalis, L. Law.

Maclura, Osage Orange.

763. *M. aurantiaca, Nutt. Law.

Morus, Mulberry.

764. M. rubra, L. Law.

Urtica, Nettle.

765. U. procera, Willd. Law.
766. U. dioica, L. Law.
767. U. urens, L. Law.

Laportea, Wood-nettle.

768. L. Canadensis, Gaudich. Law.

Pilea, Richweed.

769. P. pumila, Gr. Law.

Parietaria, Pellitory.

770. P. Pennsylvanica, Muhl. Law., Ell., Irv.

Humulus, Hop.

771. H. Lupulus, L. Law.

CALLITRICHACEÆ.

Callitriche.

773. C. verna, L. Law., Ell.
774. C. autumnalis, L. Ell., Irv.

CERATOPHYLLACEÆ.

Ceratophyllum, Hornwort.

775. C. demersum, L. Law.

PLATANACEÆ.

Platanus, Button-Ball Sycamore.

776. P. occidentalis, L. Law.

JUGLANDACEÆ.

Juglans.

777. J. nigra, L., black walnut. Law.
778. J. cinerea, L., Butternut. Lyon Co.: Popenoe.

Carya, Hickory.

779. C. olivæformis, Nutt, pecan. Osw., Humboldt.
780. C. amara, Nutt, bitter-nut. Law.
781. C. aquatica, Nutt, water bitter-nut. Law.
782. C. alba, Nutt, shagbark. Law.
783. C. sulcata, Nutt, shellbark. Law.
784. C. porcina, Nutt, pig-nut. Osaw.
785. C. microcarpa, Nutt, bark black. Osw.; also a sp. or var. with leaflets strangely cordate; fruit not seen.

CUPULIFERÆ.

Quercus, Oak.

786. Q. imbricaria, Mx., shingle oak. Law.; one tree.
787. Q. laurifolia, Mx. Near Westport, Mo., abundant; leaves on in February; black bark.
788. Q. nigra, L., black-jack. Law.; Sandy spots.
789. Q. rubra, L., red oak. Law.
790. Q. palustris, Mx., pin oak. Osw.
791. Q. falcata, L., Spanish oak. Law.
792. Q. coccinea, Wang., scarlet oak. Law.; not quite sure.
793. Q. tinctoria, Bartram, yellow-bark oak. Law.
794. Q. alba, L., white oak. Baldwin; three places; in one sinuses of leaves very deep.
795. Q. obtusiloba, Mx., (stellata), iron oak, post oak. Osw.
796. Q. macrocarpa, Mx., bur oak. Law. and elsewhere, on bottoms.
—— Q. macrocarpa, Mx. Var. or species. Leaves shorter, with fewer sinuses. Acorn more covered. Scales of cup near the fringe, tuberculate and pointed. Q. olivæformis. Law.
797. Q. Prinos, L. Swamp Chestnut Oak. Law., Osaw.
798. Q. bicolor, Willd. Swamp White Oak. Law., Osaw.
799. Q. castanea, Muhl. Chestnut Oak. Law.
800. Q. prinoides, Willd. Chinquepin Oak—four feet high. Law.
801. †Q.—— Leaves cruciform, with triangular lobes. Scales large, nearly covered, nut pointed. One tree near Tonganoxie.

Corylus, Hazel.

802. C. Americana, Walt. Law.

Ostrya, Lever-wood.

803. Q. Virginiaca, Willd. Law. Two places. Reported from Fort Leavenworth: F. Van Vliet. Atchison county: Miss Randolph.

BETULACEÆ.

Betula, Birch.

804. B. lenta, L. Osw.

SALICACEÆ.

Salix, Willow.

805. S. tristis, Ait. Law.
806. S. humilis, Marsh. Law.: Snow.
808. S. longifolia, Muhl. Law.: Snow.
809. S. nigra, Marsh. Law.: Snow.
810. S. cordata, Muhl. Law.: Snow.

Populus, Poplar.

812. P. Canadensis, Desf. (monilifera, Ait.) Law. and elsewhere.

CONIFERÆ.

Juniperus, Red Cedar.

813. J. Virginiana, L. Anderson county. Rare in the east; said to be common in the west.

ARACEÆ.

Arisæma, Indian Turnip.

814. A. triphyllum, Torr. Jack-in-the-Pulpit. Law.
815. A. Dracontium, Schott, green dragon. Law.

LEMNACEÆ.

Lemna, Duckmeat.

816. L. perpusilla, Torr. Law.
817. L. polyrrhiza, L. W. Kan.: Popenoe.

TYPHACEÆ.

Typha, Cat-tail.

818. T. latifolia, L. Law.

Sparganium, Bur Reed.

819. S. eurycarpum, Eng. Law.

NAIADACEÆ.

Naias, Water Nymph.

820. N. flexilis, Rostk. Law.

Zannichellia, Horn Pondweed.

821. Z. palustris, L. Ell.

Potamogeton, Pondweed.

822. P. natans, L. Law., Ell.
823. P pectinatus, L. Law.
824. P. —— Near P. amplexifolius. Ell.

ALISMACEÆ.

Alisma, Water Plantain.

825. A. Plantago, L. Law.

Echinodorus.

826. E. rostratus, Eng. Law.

Sagittaria, Arrow-head.

827. S. variabilis, Eng. Law., Ell., Osw. Many varieties.

HYDROCHARIDACEÆ.

Anacharis, Ditch Moss.

828. A. Canadensis, Planchon. Law.: Saunders.

ORCHIDACEÆ.

Cypripedium, Lady's Slipper.

829. C. parviflorum, Salisb. Law.: Snow.

Orchis, Orchis.

830. O. leucophæa, Nutt. Law.

Spiranthes, Ladies' Tresses.

831. S. cernua, Rich. Osaw.
832. S. graminea, var. Walterii, Lind. Burl.: from Mr. H. H. Wright.
833. S. gracilis, Bigel. Law.

Pogonia.

834. P. pendula, Lind. Top.: Popenoe. Rare.

AMARYLLIDACEÆ.

Hypoxis, Star-Grass.

835. H. erecta, L. Law.
836. H. filifolia, Ell. Top.: Popenoe. Rare.

HÆMODORACEÆ.

Lachnanthes (Dilotris), Red-Root.

837. L. tinctoria, Ell. Osw.: Dr. Newlon.

IRIDACEÆ.

Sisyrinchium, Blue-Eyed Grass.

839. S. Bemudiana, L. Law.

DIOSCOREACEÆ.

Dioscorea, Yam.

840. D. villosa, L. Osw.

SMILACEÆ.

Smilax Greenbrier.

841. S. rotundifolia, L. Osaw., Sal.
842. S. pseudo-China, L. Sal.
843. S. tamnoides, L. Osw.
844. S. peduncularis. Muhl. Law
845. S. tamnifolia, Mx. Law

LILIACEÆ.

Erythronium.

846. E. albidum, Nutt. Law.

Lilium, Lily.

847. L. Carolinianum, Mx. Law.; rare.

Scilla, Squill.

848. S. esculenta, Ker. (Fraseri, Gr.), wild hyacinth. Law., Osw., Wabaunsee county.

Allium, Onion.

849. A. cernuum, Roth. Osw.; stamens exsert, but umbels not nodding.
850. A. Canadense, Kalm. Law.
851. A. striatum, Jacq. Raw., Burl.
852. A. mutabile, Mx. Law., Osw.
853. †A. reticulatum, Fraser. Ell., Osw.

Yucca.

854. †Y. angustifolia, Ph Sal.

Polygonatum, Solomon's Seal.

855. P. biflorum, Ell. Law.
856. P. giganteum, Dietrich. Law.

Smilacina.

857. S. stellata, Desf. Law.

MELANTHACEÆ.

Melanthium.

858. M. Virginicum, L. Law.

PONTEDERIACEÆ.

Pontederia, Pickerel Weed.

859. P. cordata, L. Burl.

Heteranthera.

860. H. reniformis, Ruiz. and Pavon. Law.; flowers 8-12, violet-blue; leaves large; sinus at base narrow; common.
861. H. limosa, Vahl. Law.; common.

Schollera.

862. S. graminea, Willd. Ell.

JUNCACEÆ.

Juncus, Rush.

863. J. scirpoides, Lam., var. echinatus. Law.
864. J. nodosus, L., var. megacephalus. Law.
865. J. stygius, L. Law.
866. J. bufonius, L., toad rush. Law.
867. J. tenuis, Willd. Law.

COMMELYNACEÆ.

Commelyna.

868. C. Virginica, L. Law.

Tradescantia, Spiderwort.

869. T. Virginica, L. Law., Sal. *Glaucous*, branching, flowering all summer; separate, smooth.
870. T. pilosa, Lehm. Law., Ell., Sal., Irv. *Green*, flowering only till June; pilous only on the sepals, pedicels and base of the bracts; a var. from Salina, with leaves pilose.

CYPERACEÆ.

Cyperus, Galingale.

871. C. erythrorhizos, Muhl. Law.: Snow.
872. C. phymatodes, Muhl. Law.
873. C. Michauxianus, Schultes. Law.: Saunders.
874. C. strigosus, L. Law., Osw.
875. C. Schweinitzii, Torr Law.
876. †C. spiculatus, Wood, n. sp. Calm, tall, glabrous, triquetrous; involucre of about 7 very long, flat leaves, rough-edged, umbel 8-rayed, rays very unequal, each having from 3 to 7

simple or sub-compound spikes; spikes cylindrical, 1′ long or less, with 50–100 spikelets; spikelets minute, teretish, 1½ lines long, 8 to 10-flowered; glumes closely imbricated, mucronulate, the midvein green; stamens 3, style equaling the glume, with 3 short stigmas, rachis slightly winged. Law.

877. C. inflexus. Muhl. Law., Brookville: Popenoe.
878. C. inflexus, var. thrice taken. Law.
879. C. acuminatus, Torr. & Hook, Law.
880. C. filiculmis, Vahl. Law.
881. C. compressus, L. Law.
882. C. diandrus, Torr. Law.: Snow.

Eleocharis, Spiked Rush.

883. E. palustris, R. Br. Lam.
884. E. intermedia, Schultes. Law., Ell.
885. E. tricostata, Torr. Law.
886. E. olivacea, Torr. Law.
887. E. tenuis, Schultes. Law.
888. E. rostellata, Torr. Ell.
889. E. compressa, Sullivant. Sal.

Scirpus, Club Rush.

890. S. debilis, Ph. Law.
891. S. lacustris, L. (validus, Vahl). Bulrush. Law.
892. S. Torreyi, Olney. Sal.
893. S. fluviatilis, Gr. Law., Sal.
894. S. atrovirens, Muhl. Law., Ell., Sal.
895. S. polyphyllus, Vahl. Law.: Snow.
896. S. divaricatus, Ell. Law.
897. S. lineatus, Mx. Law.

Hemicarpha.

898. H. subsquarrosa, Nees. Law.

Fimbristylis.

899. F. spadicea, Vahl. Sal.
900. F. laxa, Vahl. Law.

Trichelostylis.

901. T. autumnalis, R. & S. Law.
902. T. capillaris, Gr. Law.

Carex, Sedge.

903. C. vulpinoidea, Mx. Law., Sal.
904. C. stipata, Muhl. Leav.: Wherrell.
905. C. setacea, Dew. Irv.: Mrs. Jewell.
906. C. cephalophora, Willd. Law.
907. C. Muhlenbergii, Schk. Law.: Snow.
908. C. sparganioides, Muhl. Irv.: Mrs. Jewell.
909. C. rosea, Schk. Leav.: Wherrell.
910. C. scoparia, Schk. Law.
911. C. cristata, Schw. Law.
912. C. trisperma, Dew. Law.
913. C. argyrantha, Tuckm. Irv.: Mrs. Jewell.
914. C. Liddoni, Boott. Top.: Popenoe.
915. C. straminea, Schk. Law.
916. C. fœnea, Willd. Law.
917. C. tenera, Dew. Law.
918. C. festucacea, Schk. Law.: Snow.
919. C. adusta, Boott. Law.
920. C. stricta, Lam. Law.: Snow.
921. C. aperta, Boott. Law.
922. C. æstivalis, Curtis. Law.
923. C. oxylepis, Torr. Irv.: Mrs. Jewell.
924. C. gracillima, Schw. Irv.: Mrs. Jewell.
925. C. Davisii, Torr. Law.
926. C. præcox, Jacq. Law.
927. C. Richardsonii, R. Br. Sal.
928. C. vestita, Willd. Law.
929. C. Emmonsii, Dew. Law.
930. C. Pennsylvanica, Lam.: Mrs. Jewell.
931. C. Novæ-Angliæ, Schw. Law.
932. C. stenolepis, Torr. Law.: Snow.
933. C. laxiflora, Lam. Law.: Snow.
934. C. blanda, Dew. Irv.: Mrs. Jewell.
935. C. conoidea, Schk. Sal.; also Top.: Popenoe.
936. C. grisea, Wahl. Sal.
937. C. granularis, Muhl. Law.
938. C. panicea, L. Law.
940. C. Hitchcockiana, Dew. Law.; also Leav.: Wherrell.
941. C. lanuginosa, Mx. Law.: Snow. Also, Ellis.
942. C. filiformis, L. Sal.
943. C. polymorpha, Nutt. Law.: Snow.
944. C. lacustris, Willd. Sal., Law.: Snow.
945. C. utriculata, Boott. Law.
946. C. ampullacea, Good. Law.
947. C. Schweinitzii, Dew. Irv.: Mrs. Jewell.
948. †C. alveoluteus. Top.: Popenoe.

GRAMINEÆ.

Leersia, Cut-grass, etc.

949. L. oryzoides, Swartz, cut-grass. Law., Sal.
950. L. Virginica, Willd., white-grass. Law., Osaw.

Zizania, Wild Rice.

951. Z. aquatica, L. Osaw., 11 ft. high; Osw.

Agrostis, Red-Top, etc.

952. *A. vulgaris, With., red-top. Law.
953. A. alba, L., Fiorin grass. Law., Sal.
954. A. scabra, Willd., rough hair-grass. Law., Sal.
955. A. elata, Trin. Law.

Vilfa, Dropseed-grass.

956. †V. depauperata, Torr. E. Kan.: Hull.
957. †V. cuspidata, Torr. Law., Sal.
958. †V. airoides, Nees & Meyer. Cloud Co.: from Mrs. Jewell.

Sporobolus, Dropseed-grass.

959. S. vaginæflorus, Torr. Law., Sal.
960. S. heterolepis, Gray. Law.
961. S. cryptandrus, Gr. Law., Sal.
962. S. asper, Kunth. Law.
963. S. longifolius, Wood. Law., Sal. The last two are by some reckoned as one.
964. S. Indicus, Brown. Law.; one place.

Cinna, Sweet Reed-grass.

965. C. pendula, Trin. Osw.
966. C. arundinacea, L. Osaw.

Muhlenbergia, Dropseed-grass.

967. M. glomerata, Trin. Law., Ell., Sal.
968. M. Mexicana, Trin. Law., Ell., Sal.
969. M. sobolifera, Tr. Law.
970. M. sylvatica, T. & A. Sal.
971. M. Wildenovii, Trin. Osw.
972. M. diffusa, Schreb. Law.
973. Muhlenbergia innominata. "Slender, glabrous, branching, one foot high; panicle erect, capillary loose, branches in 3s and 5s, whorled. Spikelets scarcely 1″ long, much shorter than their pedicels. *Glumes pointed, rough on the keel, the upper one shorter, but longer than the two equal obtuse three-veined pales* which have a few short beards at the base. Comes nearest to M. Mexicana, but is decidedly different by the characters italicized." Thus described by Prof. Wood, Osawatomie, 1873.

Calamagrostis.

974. C. Canadensis, Beauv., blue-joint. Law. One place.

Alopecurus, Foxtail.

975. A. aristulatus, Mx. Sal.: Sent to Prof. Snow.
976. †A. Alpinus, Smith. Sal.

Aristida, Beard-grass.

977. A. gracilis, Ell. Sal.
978. A. purpurea, Nutt. Sal.
979. A. oligantha, Nutt. Sal.

Stipa, Feather-grass.

980. S. juncea, Ph. (spartea of some.) Law., Sal.

Oryzopsis, Mountain Rice.

981. O. melanocarpa, Muhl. Osw.: Dr. Newlon.

Paspalum.

982. P. setaceum, Mx. Law.
983. P. læve, Mx. Osw.; also, Rooks Co.: Popenoe.
984. P. fluitans, Kunth. Osaw.
985. P. sanguinata, Lam., crab-grass. Law.

Panicum, Panic-grass.

986. P. capillare, L. Law., Osw.
987. P. autumnale, Bosc. Sal.
988. P. proliferum, Lam. Law.
989. P. anceps, Mx. Law.
990. P. amarum, Ell. Law.
991. P. virgatum, L. Law., Osw. A fine grass.
992. P. dichotomum, L. Law., Sal.
993. P. depauperatum, Muhl., sp. var. Sal.
994. P. pauciflorum, Ell. Law., Sal.
995. P. pubescens, Lam. Law.
996. P. viscidum, Ell. Law.: Snow.
997. P. clandestinum, L. Law., Ell.

Oplismenus, Cockspur-grass.

998. *O. Crus-galli, Kunth. Law. Rare.
— O. Crus-galli, var. muticus. Law., common. Ell., Sal. *

Setaria, Bristly Foxtail.

999. *S. glauca, Beauv., bottle-grass.
1000. *S. viridis, Beauv. Law.; rare.

Cenchrus, Bur-grass.

1001. C. tribuloides, L. Law.

Phalaris, Canary-grass.

1002. P. arundinacea, L. Law., Sal.

Bromus, Brome-grass.

1003. B. seculinus, L., chess. Law., Sal.
1004. B. racemosus, L. Law.
1005. B. ciliatus, L. Law.

Tricuspis, False Redtop.

1006. T. sesleroides, Torr. Law., Osw.; tall and handsome.
1007. T. purpurea, Nutt (Uralepis). Law.; on river sand.
1008. †T. acuminata, Thurb. Dodge: Popenoe.

Dactylis, Orchard-grass.

1009. *D. glomerata, L. Law.

Kœleria.

1010. K. cristata, Smith. Law., Sal.
— K. cristata, var. nitida, Nutt. Law.

Diarrhena.

1011. D. Americana, Beauv. Law.

Festuca, Fescue-grass.

1012. F. tenella, Willd. Law., Ell., Top.: Popenoe.
1013. F. ovina, L., sheep's fescue. Law.
1014. F. nutans, Willd. Top.: Popenoe.

Eatonia.

1015. E. obtusata, Gr. Law., Osw.

Melica.

1016. M. mutica, Walt. Law.

Eragrostis.

1017. E. reptans, Nees. Law., Osaw.
1018. E. poæoides, Beauv. Law., Ell., Osw.; known by its unpleasant odor.
1019. E. pilosa, L. Law.
1020. E. hirsuta, Wood. Law.
1021. E. capillaris, Nees. Law.
1022. E. tenuis, Ell. Law.
1023. E. erythrogona, Nees (Frankii, Meyer). Law.

Poa, Spear-grass.

1024. P. annua, L. Sal., S. W. Kansas: from Prof. Mudge.
1025. P. compressa, L. Blue-grass. Law.
1026. P. sylvestris, Gr. Law.
1027. P. trivialis, L. Leav.: Wherrell.
1028. *P. pratensis, L. Kentucky Blue-grass. Law.

Brizopyrum.

1029. B. spicatum, Hook. Ell., W. Kas.: Popenoe.

Glyceria, Manna-grass.

1030. G. acutiflora, Torr. Law.
1031. G. nervata, Torr. Law.

Uniola, Union-grass.

1032. V. latifolia, Mx. Law., Osw.

Phragmites, Reed.

1033. P. communis, Trin. Law. In wet places. Eleven feet high.

Lepturus.

1034. L. paniculatus, Nutt. Law.

Hordeum, Barley.

1035. H. jubatum, L. Sal.
1036. H. pusillum, Nutt, Law.

Elymus, Wild Rye.

1037. E. Virginicus, L. Ell., Sal.
1038. E. Europæus, L. Law., Sal., Osw.
1039. E. Canadensis, L. Law., Ell., Sal.
1040. E. striatus, Willd. Law., Ell., Sal.
1041. E. Hystrix, L. Law.
1042. †E. —— form with 5-7 spikelets at each joint. I thought E. condensatus, but Mr. Hall says it is not.

Triticum, Wheat, &c.

1043. T. repens, E. Quick-grass. Sal.
1044. T. violaceum, Hornem. Law.

Leptochloa.

1045. E. mucronata, Kunth. Law., Osaw.
1046. L. fascicularis, Gr. Law

Eleusine, Yard-grass.

1047. E. Indica, L. Law.

Spartina, Cord-grass.

1048. S. cynosuroides, Willd. Law., Osw.

Buchloe, Buffalo-grass.

1049. †B. dactyloides, Eng. Ell.

Bouteloua, Musket-grass.

1050. B. curtipendula, Gr. Law., Osw.
1051. B. oligostachya, Torr. Law., Ell., Sal.
1052. B. hirsuta, Lag. Law., Sal.

Munroa.

1053. M. squarrosa, Torr. Ell.

Tripsacum, Sesame-grass.

1054. T. dactyloides, L. Law.

Andropogon, Beard-grass.

1055. A. furcatus, Muhl., blue-stem. Law., Sal.; six feet high.
1056. A. scoparius, Mx., broom-grass. Law.
1057. †A. Torreyanus, Stendel. Sal.

Sorghum.

1058. S. nutans, L. Law., Sal., Osw.

HYDROPTERIDES.

Marsilia.

1059. M. quadrifolia, L. Ell.
1060. M. vestita, Hook. and Grev. Ell.
1061. M. uncinata, Braun. Ell.

EQUISETACEÆ.

Equisetum, Horse-tail.

1062. E. arvense, L. Law.
1063. E. sylvaticum, L. Law.
1064. E. pratense, Ehr. Law.: Snow.
1065. E. robustum, Braun. Law., Sal.
1066. E. hyemale, L. Scouring Rush. Law.

FILICES, FERNS.

Botrychium, Grape Fern.

1067. B. lunarioides, Swz. Leav.; Mr. Wilson.
1068. B. Virginicum, L. Rattlesnake Fern. Leav., Law.

Polypodium, Polypod.

1069. P. incanum, Ph. Burl.: Mrs. J. N. Locke.

Notholæna.

1070. †N. dealbata, Kunze. Humboldt. Brought by Prof. Knox.

Onoclea, Sensitive Fern.

1071. O. sensibilis, L. Leav.
—— O. sensibilis, var. obtusilobata, Torr. Leav.: Wilson.

Struthiopteris, Ostrich Fern.

1072. S. Germanica, Wild. Law.

Pellæa, Rock Brake.

1073. P. atropurpurea, Link. (Pteris, L.; A. Nosorus, Gr.) Leav., Humboldt; Prof. Knox.

Adiantum, Maidenhair.

1074. A. pedatum, L. Leav., Law.

Asplenium, Spleenwort.

1075. A. angustifolium, Mx. Leav.
1076. A. filix-fœmina, Bernh., lady fern. Leav.: Wilson.

Camptosorus, Walking Fern.

1077. C. rhizophyllus, Link. (Antigramma, Smith.) Leav.

Woodsia, Rock Polypod.

1078. W. obtusa, Torr. Leav.

Cystopteris, Bladder Fern.

1079. C. fragilis, Bernh. Leav., Law.

Aspidium, Shield Fern.

1080. A. Goldianum, Hook. Leav.
1081. A. spinulosum, Willd. Law.: Saunders.

HEPATICÆ.

Marchantia.

1082. M. polymorpha, L. Law.: Saunders.

Orders, 107; genera, 443; species, 1082. Species not native, about 41; species not east of the Mississippi, 150.

METEOROLOGICAL SUMMARY FOR 1876.

PROF. F. H. SNOW'S ANNUAL REPORT AS METEOROLOGIST TO THE STATE BOARD OF AGRICULTURE.

STATION: Lawrence, Kansas. Latitude 38° 58′; longitude 95° 16′; elevation of barometer and thermometers, 884 feet above the sea level, and 14 feet above the ground; rain gauge on the ground; anemometer, 105 feet above the ground, on the dome of the University building, 1,150 feet above the sea level.

The chief peculiarities of the weather of 1876 were as follows:

1. The high temperatures of the first two months of the year, which were the warmest January and February on our nine years' record. These were followed by the coldest March on our record; colder than either of the three preceding winter months, and bringing with it seventeen inches of snow.

2. The absence of great extremes of either heat or cold.

3. The large and well-distributed rainfall, which resulted in immense crops of wheat and corn in all parts of the State. This result is mentioned as a peculiarity, not as an exception. In only one of the nine years record has there been a serious shortening of crops on account of a deficiency in the amount or distribution of the annual rainfall.

TEMPERATURE.

Mean temperature of the year 52°.76, which is only 0°.06 below the mean of the eight preceding years. The highest temperature was 98° on the 23d of June; the lowest

temperature was 5° below zero, February 1st and December 30th, giving a yearly range of 103°. Mean temperature at 7 A. M., 47°.44; at 2 P. M., 62°.33; at 9 P. M., 50°.76.

Mean temperature of the winter months 32°.03 (a slight fraction above the freezing point), which is 3°.62 above the average winter temperature; of the spring, 51°.62, 1°.34 below the average; of the summer, 75°.51, 1°.26 below the average; of the autumn, 51°.87, 0°.53 below the average.

The coldest month of the year was December, with mean temperature of 23°.60; the coldest week was December 24th to 30th, with mean temperature 14°.60; the coldest day was February 1st, with mean temperature 1°.60. The mercury fell below zero only four times, once in February and three times in December.

The warmest month of the year was July, with mean temperature 78°.60; the warmest week was July 15th to 21st, with mean temperature 82°.14; the warmest days were June 23d, July 17th and 19th, each with mean temperature 85°.5. The mercury reached or exceeded 90° on thirty-six days, viz.: six in June, twelve in July, fourteen in August and four in September. The mercury did not reach 100° during the year.

The last frost of spring (quite severe) was on April 5th, the first light frost of autumn was on September 29th, giving an interval of 177 days entirely without frost. The first severe frost of autumn was on October 1st, giving a period of 179 days without severe frost. No frost or cold weather during the year caused any damage to fruit or fruit buds.

RAIN.

The entire amount of rain, including melted snow, was 44.18 inches, which is greater by 5.67 inches than any previous annual rainfall upon our record, and is 11.20 inches above the average annual amount for the eight preceding years. Either rain or snow fell on 102 days. The unusual amount of rain was well distributed, there being no damaging excess or deficiency in any month of the growing season. The longest interval without rain from March 1st to October 1st was nine days. The number of thunder showers was twenty-nine.

SNOW.

The entire depth of snow was 24¾ inches, of which one-fourth of an inch fell in February, 17 inches in March, 3½ inches in November, and 4 inches in December. The last snow of spring was on March 28th; the first snow of autumn was on Nov. 13th.

FACE OF THE SKY.

Average cloudiness of the year, 41.27 per cent. of the sky, which is 4.22 per cent. less than the average for the eight preceding years. The number of clear days (less than one-third cloudy) was 182; half-clear days (from one-third to two-thirds cloudy), 105; cloudy (more than two-thirds), 79. There were 49 days without a cloud, and 31 without a trace of sky. August was the clearest month, with mean cloudiness 26.66 per cent.; March was the cloudiest month, with mean cloudiness 60.45 per cent. The mean cloudiness at 7 A. M. was 44.31 per cent.; at 2 P. M., 44.12 per cent.; at 9 P. M., 35.39 per cent.

DIRECTION OF THE WIND.

During the year, three observations daily, the wind was from the N. W. 330 times; S. W., 313 times; S. E., 147 times; N. E., 135 times; S., 66 times; E., 43 times; N., 32 times; W., 22 times; calm, 10 times. The south (including southwest, south and southeast) winds outnumbered the north (including northwest, north and northeast) winds, in the ratio of 526 to 497.

VELOCITY OF THE WIND.

The number of miles traveled by the wind during the year was 148,120. This gives a mean daily velocity of 404.70 miles, and a mean hourly velocity of 16.85 miles. The highest hourly velocity was 75 miles, on April 19th; the highest daily velocity was 1,010 miles, on February 1st; the highest monthly velocity was 15,690 miles, in March. The

winds of the first half of the year were much stronger than those of the second half. The lightest winds were in July and August.

BAROMETER.

Mean height of the barometer, 29.102 inches — precisely the same as in 1875. Mean at 7 A. M., 29.126 inches; at 2 P. M., 29.079 inches; at 9 P. M., 29.100 inches. Maximum, 29.754 inches, on November 30th; minimum, 23.431 inches, on October 20th; yearly range, 1.320 inches. The highest monthly mean was in December, 29.260 inches; the lowest was in June, 29.010 inches. The barometer observations are corrected for temperature and instrumental error, but not for elevation.

RELATIVE HUMIDITY.

The average humidity of the air for the year was 66.8; at 7 A. M., 77.9; at 2 P. M., 48.08; at 9 P. M., 74.65. The dampest month was July—mean humidity, 78.6; the dryest month was February, with mean humidity 59. There were only four fogs during the year. The minimum humidity at any single observation was only 7.6 per cent., or about one-thirteenth of saturation.

The following tables give the mean temperature, the extremes of temperature, the relative humidity, and the rainfall for each month of the year 1876, and a comparison with preceding years:

Months.	Mean temperature	Maximum temperature	Minimum temperature	Relative humidity	Rainfall in inches	Excess or deficiency in rainfall
January	34.70	65.5	2	68.4	0.57	0.72†
February	37.80	74.5	—5	59.0	0.36	0.58†
March	34.25	66.0	0	69.4	4.51	2.34*
April	55.60	87.5	30	59.6	3.38	0.46*
May	65.00	89.0	39	64.5	6.75	3.09*
June	70.24	98.0	50	68.6	12.11	8.54*
July	78.60	95.0	60	72.7	3.51	1.32†
August	77.70	94.0	63	72.4	4.45	0.23*
September	64.70	92.0	34	68.6	3.58	0.18*
October	53.40	83.5	25	59.8	1.93	0.41†
November	37.50	72.0	9	70.9	2.60	0.88*
December	23.60	66.0	—5	68.9	0.43	1.47†

COMPARISON WITH PREVIOUS YEARS.

Years.	Mean temperature	Maximum temperature	Minimum temperature	Relative humidity	Rainfall in inches	Excess or deficiency in rainfall
1876	52.76	98.0	—5.0	66.8	44.18	11.20*
1875	50.60	99.0	—16.5	65.5	28.87	4.11†
1874	54.20	108.0	—3.0	65.5	28.87	4.11†
1873	52.71	104.0	—26.0	64.0	32.94	0.04†
1872	51.90	97.0	—18.0	64.4	32.63	0.35†
1871	54.30	103.0	—6.0	.....	33.23	0.25*
1870	54.50	102.0	—10.0	68.4	31.38	1.60†
1869	50.99	96.0	—5.0	.....	38.51	5.53*
1868	53.36	101.0	—16.5	.....	37.42	4.44*

* Excess. † Deficiency.

LOCUST FLIGHTS EAST OF THE MISSISSIPPI.*

BY PROF. C. V. RILEY, OF ST. LOUIS.

To the unscientific mind there are few things more difficult of apprehension than that species, whether of plants or animals, should be limited in geographical range to areas not separated from the rest of the country by any very marked barriers, or by visible demarkations. Yet it is a fact well known to every naturalist, and the geographical distribution of species forms at once one of the most interesting and one of the most important studies in natural history. Some species have a very limited, others a very wide, range; and while in the course of time—in the lapse of centuries or ages—the limits have altered in the past and will alter in the future, they are, for all practical purposes, permanent in present time. These limits may in fact, for the purpose of illustration, be likened to those which separate different nations. Though frequently divided by purely imaginary lines, the nations of Europe, with their peculiar customs and languages, are well defined. Along the borders where the nations join, there is sometimes more or less commingling; at other times the line of demarkation is abrupt—and in no case could emigrants from the one long perpetuate their peculiarities unchanged in the midst of the other. Yet in the battle of nations the lines have changed, and the map of Europe has often been remodeled. So it is with species. On the borders of the areas not abruptly defined, to which species are limited, there is more or less modification from the typical characters and habits; while in the struggle of species for supremacy, the limits may vary in the course of time. The difference is, that the boundaries of nations result from human rather than natural agencies, while those of species result most from the latter, and are therefore more permanent. It is scarcely necessary to add that these remarks apply to species as they are found in nature, and uninfluenced by man. The spread of species by man's direct or indirect influence is equally interesting; but it is not my purpose to consider it in this connection.

I found some difficulty at the late conference of Governors at Omaha to consider the locust problem, in satisfying those present that the Rocky Mountain locust could not permanently thrive south of the 44th parallel or east of the 100th meridian, and that there was no danger of its ever extending so as to do serious damage east of a meridian line drawn a little west of the center of Iowa. They could not see what there was to prevent the pest from overrunning the whole country, and thought that Congress should be appealed to not alone on behalf of the country that had suffered from its ravages, but on behalf of the whole country that is threatened therefrom. In my last two reports I have discussed the native home of the species, and I will here endeavor to present the conditions which prevent its permanent settlement in the country to which it is not native.

Briefly, the species is at home and can come to perfection only in the high and dry regions of the Northwest, where the winters are long and cold and the summers short; and whenever it migrates and oversweeps the country to the south or southeast, in which it is not indigenous, the changed conditions are such that the first generation hatched out in that (to it) unnatural climate, either forsakes it on the wing, or perishes from debility, disease and general deterioration. On the soundness of this conclusion depends the future welfare of the most of the more fertile States between the Mississippi and the Rocky Mountains; and science, as well as past experience, shows it to be sound. Upon

*This article was first prepared for the *Scientific American*, and was read before the Kansas Academy by request.

this hypothesis the people of nearly the whole country so scourged during this year, and so threatened next spring, may console themselves that the evil is but temporary; they may have to fight their tiny foe most desperately next spring, but they have also the assurance that even if he prove master of the field, he will vacate in time to allow of good crops of some of the staples, and that he may not return again for years. On the other hypothesis—for which there is no apparent, and no real reason—ruin stares them inevitably in the face.

The causes which limit the eastward flight of the winged swarms that come from the northwest, are, with the majority of the people, still more difficult to appreciate; for most persons can see no reason why a swarm that overruns the westerns portions of Minnesota, Iowa and Missouri, should not extend to the eastern borders of the same States, or into Illinois, Indiana, Ohio, and eastward. Without discussing some of the more occult climatic influences that bear on the belief that they never will, the principal arguments rest in the facts that—1st, the power of flight of any insect that has a limited winged existence, must somewhere find a limit; 2d, that all past experience has shown that *Caloptenus spretus* has never extended, in a general way, beyond the limit indicated, and that as long as the present average conditions of wind and climate prevail, it is reasonable to suppose that it never will.

One of the principal difficulties in the way of a proper apprehension of the facts is found in the failure, in the popular mind, to discriminate between species. The ordinary newspaper writer talks of *the* grasshopper, or *the* locust, as though all over the country and all over the world there was but one and the same species. One of the governors present at the conference referred to, was at first fully of the belief that our Rocky Mountain pest came all the way from Asia. In the case of this destructive species, even some entomologists have added to the difficulty by erroneously claiming that it is common all over the country to the Atlantic ocean.

The above thoughts are suggested by the following reports, that have just met my eye, in the Cincinnati *Gazette* of the 24th inst., from Dayton and Hamilton, respectively:

"The advent of Kansas grasshoppers, over Sunday and until Monday evening, in great numbers throughout this city, is a most remarkable incident. They were found early Sunday morning, and left, as suddenly as they came, on Monday evening."

"A shower of mammoth grasshoppers came down upon our town and vicinity on Saturday night. We have never seen such large ones before, and we understand from old citizens that they are entire strangers in this part of the country. We saw a boy have a string tied to two of them, (which were as long as a man's finger,) trying to drive them, and he succeeded pretty well."

"A flock of grasshoppers alighted in Hamilton about 11 o'clock on Saturday night, from the northwest. Those that were not drowned in the river or killed by the heavy rain, were probably gobbled up before Sunday night by the chickens."

Such reports as these very naturally confirm the unscientific in the idea that the locust plague of the West, or so-called "Kansas grasshopper," has overstepped the limits entomologists ascribe to it, and is upsetting the conclusions of science. The same swarm passed over Oxford, in the same State, in a southwesterly direction, and fortunately that veteran and well-known apiarian, the Rev. L. L. Langstroth, who has not forgotten to be a close observer, had specimens sent to me. They prove to be the American acridium (*Acridium Americanum*). As stated in my Eighth Report, it is the largest and most elegant locust, the prevailing color being dark brown, with a pale yellowish line along the middle of the back when the wings are closed. The rest of the body is marked with deep brown, verging to black, with pale reddish-brown, and with whitish or greenish-yellow; the front wings being prettily mottled, the hind wings very faintly greenish, with brown veins, and the hind shanks generally coral-red, with black-tipped white spines. The species is quite variable in color, size and marks, and several of the varieties have been described as distinct species—by the species grinders. It has a wide

range, hybernates in the winged condition, and differs not only in size and habits from the Rocky Mountain locust, but entomologically is as widely separated from it as a sheep from a cow. It is a species common over the country every year, and during exceptional years becomes excessively numerous and acquires the migratory habit, its wings being long and well adapted to flying. It has been very abundant the present year, and toward the end of July, while in the unfledged condition, did an immense amount of damage to the cotton and other crops of Georgia and South Carolina. The papers were full of graphic accounts of their destruction, and editors not only very generally took it for granted that they had to do with the Western *spretus*, but Mr. T. P. Janes, Commissioner of Agriculture for Georgia, in his circular No. 27, supposed they were the same. Specimens which he subsequently sent me, however, at once revealed their true character.

In September, 1875, large swarms of locusts passed over Illinois, and those who were bent on the idea that there was no reason why that State should not be overrun with the Rocky Mountain locust, found the apparent justification for their views in the said swarms. Yet these proved to be composed of three species,* indigenous to Illinois, and every year common there; and after settling they did no harm, and nothing was heard of their progeny the following spring—all of which would have been very different had it been a question of the Western *spretus*.

The damage done by some of the more common locusts that occur over the country, is sometimes very great, especially during hot, dry years. In some of the New England States their ravages have, in restricted localities, fairly equaled those of the voracious *spretus* of the West. But while a few of them, under exceptional circumstances, develop the migratory habit, they none of them ever have, and in all probability never will, compare with *Caloptenus spretus* in the vastness of its migrations and in its immense power for injury over extensive areas.

In economic entomology, discrimination between species is very important, and a lack of it often leads to most erroneous conclusions. Whenever we hear of locust flights east of the Mississippi, we may rest satisfied that they are not of our Rocky Mountain pest, and are comparatively harmless.

MANHATTAN, KAS., Oct. 28, 1876.

ADDITIONS TO KANSAS MAMMALIA.

BY M. V. B. KNOX, OF BALDWIN CITY.

2a. *Lynx rufus, var. maculatus*, Horsfield and Vigors. Texas Wild Cat. Less frequent than *L. rufus*.

39. ———. Mouse, taken near Baldwin; not yet identified.

62. *Sorex* ———. Taken at Coal Creek, 1873, by C. K. Jones.

63. *Hesperomys Nuttalli*, Harlan. Red Mouse. In Col. Goss' museum, Neosho Falls. Taken at Colony, March 7, 1873, by J. J. Fairbanks

64. *Arvicola pinetorum*, LeC. Taken near Baldwin City, 1876.

65. *Perognàthus flavus*, Baird. Taken at Nickerson, Reno county, May, 1876.

66. *Blarina talpoides*, Gapper. Taken at Baldwin City, by Geo. Cheney, April 6, 1877.

*The Differential locust (*Caloptenus differentialis*), the Atlantic locust (*Caloptenus Atlantis*), and the red-legged locust (*Caloptenus femur-rubrum*).

THE INFLUENCE OF FOOD-SELECTION UPON THE EVOLUTION OF ANIMAL LIFE.

BY DR. A. H. THOMPSON, TOPEKA, KANSAS.

The influence that food-selection exercises in directing the course of the development of animal life, is a factor of the principle of evolution that has scarcely received the attention at the hands of naturalists and physiologists that its importance deserves. Its potency is manifested in such a marked manner as to be, under some circumstances, a prime factor in the determination of great changes in the phenomena of animal life, even of catastrophes, and yet it has been relegated by most philosophic biologists, when recognized at all, to a second or third place in the order of forces. Many are the theories that have been woven and elaborated in regard to the origin and evolution of life, in the name of the developmental principle, and many are the factors that go to make up the argument in favor of each one. But in the table of forces acknowledged, direct, indirect and accidental, food-selection rarely finds a place under any name, and is still more rarely reckoned as more than an accidental influence.

By the term *food-selection* we designate that power which each particular substance used as food exercises in causing certain species of animals to employ it for sustenance; *i. e.*, it directs the choice of animals towards itself for sufficient reasons to induce them to use it for food, such as convenience, adaptability, etc. If a given species in a certain district be surrounded by a constant supply of its proper food, it is drawn towards it, employs it, and lives;—the food-environment favors life. But it may not be thus permanent and favorable to the perpetuation of a certain stage in the life of a species. In fact, it rarely is so, but may be changeful and inconstant. In this case, the food imposes upon the animal organization employing it, the necessity of ever changing in conformity to the new conditions ever being presented. The power of food to induce change in the animal organism, and maintain or alter it at its own caprices, is the selection which dictates change.

The dependence of animals for life upon the food-supply, is the most apparent fact of their existence. Every process of their physiology, the movement of every muscle, the production of every bone or other tissue, the action of every gland or nerve-cell, the wonderful processes of origin, growth and reproduction, depend for their maintenance and success upon the completeness of the nutritial supply. Nutriment for the tissues, the mysterious pabulum that upholds life, is derived from the food eaten, and consequent upon the acquisition of food is the continuance of life with all its phenomena, as well of the species as of the individual. All animal life, throughout all time, has been thus dependent, and the variation of the quantity or quality of food has caused some modification of all the forms that ever lived upon the earth. Its importance as a potent modifying influence can scarcely be over-estimated, and is, perhaps, second only to cosmical influences in the potency of its effects upon animal life. The pursuit and procurement of food is the one occupation of all animals; their one object in life being the obtaining of it, that life may be maintained and transmitted. Much force is expended by animals in the augmentation of the species, and success in this depends altogether upon the completeness of the food-supply, and its proper assimilation. One of the first indications of insufficiency of food among all animals, man included, is decrease of reproduction.

This paramount dependence of the animal organism upon food, necessitates the adaptation of the organs of the economy that procure, reduce and assimilate it for the nutrition of the tissues, to the kind of food employed. Upon this proposition rests the theory of

this paper, *i. e.*, that through the necessity of food to animals, modification necessary to adaptation to the food used has taken place, and that through this adaptive modification extensive differentiation of animal structure has obtained, through the multiplicity of food-changes.

Given the presence of food, the first important function, the first action, indeed, performed by the animal in its procurement, is *prehension*—the seizing and conveying of the food to the organs of mastication and deglutition. The organs exercising this function are of wonderful variety, but in each species are specially adapted to the kind of food employed. In *Mammalia*, for instance, the organs of prehension are especially the lips of the mouth, but which are further assisted in many species by other organs, as in *Bimana*, *Quadrumana*, *Rodentia*, and *Marsupialia*, by the fore limbs; in the elephant, by the proboscis; in the tapir, by the snout; in the ant-eater and giraffe, by the tongue, etc.; and are supplemented, usually, by the teeth, for more forcible seizure and retention.

The next function performed, is *mastication*. This is effected by the teeth, with their supporting environments—the jaws, muscles, etc. This region is, perhaps, the most readily susceptible to food-changes, and the influence of food-selection. It is the gateway to the economy upon which the entire alimentary system depends for the nutrient substances that maintain life. It is the set of millstones through which all food must pass, and by which all food must be reduced into digestible form. The masticating region is the most variable of the entire organism, and presents more variety, taken throughout the whole animal world, than any other special region of the economy. The cause of this mutability of structure we assume to be due to the influence of food-selection, exercising its power in modifying the parts with which the food comes so forcibly in contact, on entering the animal system. The masticating apparatus must be adapted, preëminently, to the food employed, for upon the adjustment to the work of reducing it, everything depends. Modification and re-modification in conformity to food-changes is a constant law of the being and usefulness of this region; and this has indeed obtained through the long ages, until the contemporary result in our own time is a wonderful variety of forms of masticating apparatus. This is the work of food-selection—a conformity of tools to material, not of food to organs.

In the further observation of the animal organization, we find the same adaptation. Throughout the length of the alimentary canal, in the deglutition, digestion, solution and assimilation of food; in all the processes whereby the food used is converted into nutrient pabulum for the support of the life and growth of the tissues, evolution has performed the work of perfect conformation of the organs to the food as employed. As evidence in point, we may note the difference between the stomach of a ruminant and a carnivore, employing highly specialized forms of extensive classes for examples. In the ruminant the many compartments into which the stomach is divided, the lengthy intestine, and the complicated process necessary for the elaborate digestion and solution of vegetable food, is in marked contrast to the simple stomach and alimentary system of the carnivore, whose food (being animal tissue already converted from the vegetable) requires the merest dissolving preparatory to absorption and assimilation. In the ruminant the long intestine presents an extensive absorbing surface to the slowly-dissolving bolus of vegetable tissue; while in the carnivore, the intestine is short, as absorption of its food is chiefly performed in the stomach, and a long intestine is useless. This is in keeping with the fact that animal food is chiefly dissolved and absorbed in the sac of the stomach, and vegetable, starchy foods are acted upon and absorbed in the intestine. In omnivorous animals, as man, for a mixed diet we find a mixed capacity, while in vegetable feeders and carnivora of all grades, these organs are adapted to the food used.

But let us glance at some other forms as peculiarly adapted to their food, as employed, and the apparent causes for modification.

Taking *Rodentia*, we find the peculiar feature of the order to be the two strong, curved, cutting, continuously-growing incisors, which are undoubtedly so modified for a purpose. The origin of these specialized teeth must have been the accidental preference of nuts and barks of trees, which induced a variation and developed the peculiar organs, with accompanying modification of the remainder of the denture and of the digestive region. Many of the members of this order became climbers, to obtain their food more readily, and some species took up their abode in the trunks of trees, living an arboreal life convenient to their food, and protected by the plants that bore it. Some of them became burrowers, in order to obtain roots and barks in the ground and the small grains of low plants, and their burrowing habits soon developed their chief protection against their enemies, many of them becoming so completely adapted in their limbs to this work as to be almost incapable of progression upon level ground.

In *Bradypus*, we find a peculiar adjustment of the curious teeth to the mere crushing of the leaves and shoots of trees, and a remarkable conformation of the stomach to this coarse food, it being divided into compartments by transverse ligatures for the longer retention of food for digestion. But a most peculiar feature in these animals is their adaptation to an almost complete arboreal life, by the legs being modified for the suspension of the body beneath the limbs of trees, and its living and moving continually in this position. This peculiarity we claim to be one of the indirect results of food-selection.

In the giraffe we observe another leaf-eater, whose limbs are modified for a terrestrial existence, while it is enabled to reach the branches of trees by means of elongated neck and legs, these having been developed by a preference for the shoots and buds of trees.

In the *Carnivora* we find strong jaws with strong muscles for the exercise of great power in seizing and tearing prey; also a lithe, elastic and powerful systemic framework, for pursuing and overcoming other animals. As their food requires no mastication, there is no lateral movement of the jaws, in the purest forms, but these are merely capable of extensive opening and forcible closure. In the vegetable-feeder, on the contrary, the lateral movement capacity of the jaws is largely developed to allow of trituration, while extensive and forcible vertical movement is suppressed. The claws of *Felidæ* may also be reckoned as the product of food-selection, being developed and used in the capturing and tearing of prey.

A remarkable instance of evidence in our favor is found in some of the *Cetacea*. *Balænidæ* are noted for the absence of teeth, which are superseded by rows of *baleen* or whalebone, which fringes the opening of the mouth, and by means of which small sea-animals (chiefly *Pteropoda*), its food, are strained from the water. This adaptation to this food is comparatively recent, as numerous rudimentary teeth are found in the jaws in early fœtal life, evidencing a former condition in which teeth were possessed and used upon different food. The usurpation of these organs by a peculiar growth that is better adapted to the food which plentifully surrounds these animals, indicates a rapid and wonderful power of modification by food-selection. The animal also possesses a very small œsophagus, to guard against the entrance of larger food which has not been reduced for want of teeth.

We are reminded here of an opposite example of a disproportionate power of deglutition—that of *ophidia*. In these reptiles, the food, often disproportionately large, is swallowed by permission of the articulation of the inferior maxillary and its attachments, which part and separate to a remarkable extent to allow the large object to pass. The denture is formed for seizure and gradual creeping up upon the victim.

But we cannot go into further minutiæ. We have thus glanced at some of the more specialized forms which furnish most marked evidence; but the adaptation of form to food is just as perfect in all other species.

As has been already stated, other conditions being in harmony, the persistence of the food-supply will induce and determine the permanence of a given species or genus.

The preservation of many species through long geological ages must, in many cases, be due to this law; but the opposite condition of the rapid changing of food, fitful and inconstant conditions, the rapid succession of extremes, will necessarily destroy life, and cause the extinction of a species depending upon it. The mean condition of slow, persistent deviation will cause modification and adaptation of structure, and consequent preservation of life. Almost any species can tolerate a very slight alteration of its food with little inconvenience; and a persistence of the change, inducing a tendency in a certain direction, will inevitably bring its appropriate modification of animal structure, through the simple law of adaptation of form to environments. Food being an important environment of every animal, change in its conditions must enforce change upon the animals depending upon it. Food-selection acting as a persistent, moulding force upon a mutable recipient, the animal organism, the result of its influence in every movement must be alteration of the organism towards the direction of least resistance. This direction of change must be the one of conformation to the new condition, and adaptation to the new characteristics of the food as presented.

Every species must be capable of converting all food into nutriment that lies within a certain range and limit, and the widening of this limit is a comparatively easy operation. Its extension in a certain direction and contraction in another will, by a continual succession of such movements, bring a total and complete change of form. Branching, deviation by a few groups of members of a species in different directions, may give rise to different forms, and in time become established as forever separate species.

The factors that enter the arena as active causes of the phenomena of changes in the all-potent food environment, are numerous and variable. In the vegetable world, upon which all animals depend for their food either directly or indirectly, the causes inducing its variation as a food are legion; and in the present state of our knowledge very few are even partially understood. There are forces and inter-forces, acting variously and erratically, so that in the main we can comprehend but little of their workings.

Cosmical influences have determined the quantity and quality and the main characteristics of the plant world from the beginning, and through it of the animal world. In the earliest history of the earth, when it was just sufficiently cooled from its cosmical fusion to be habitable for the earliest forms, these were such forms and manifestations of life as the conditions induced and permitted. The meager and lowly-organized animal life was moulded to and subsisted upon the vegetable life which was its cotemporary. This plant life existed undoubtedly—indeed, *must* have existed—in order to make animal life possible, as the latter unquestionably depended from its genesis upon the plant life coëxisting, even though they may have been evolved simultaneously from the primary protoplasmic substance which is the mysterious basis and origin of all organic life. Food-selection, at the first, touched the shadowy, unknown beginnings of life; and has, from its very threshold, held all life in its powerful embrace, molding it as the sculptor does his clay!

Whatever the subtle influences may be, so mysterious yet so potent and forceful—be it peculiarities of soil or air, inconstancy of the methods of fertilization, fortune or misfortune in the struggle for existence—whatever the quiet, irresistible force may be that induces a change in the quantity or quality of a plant as a food for a species of animal, when the change comes the animal must change with it or perish. Suppose a peculiar quality is developed in a plant in a particular locality, and the animal there making it its habitual food prefers the change and follows it closely. Preference leads to habit, variation is begun, natural selection seizes the new tendency, and by the power of food-selection modifies the animal economy to the new food. The same species in another locality may have its food suffer from some influence so as to cause deterioration and become unfit for use, and compel it to adopt a nearly allied plant. This plant having previously been but occasionally used for food, its entire adoption would cause some

change in the animal organism, and a variation in a certain direction. Again, a class of plants may develop a peculiar flavor, possibly due to the influence of insect fertilization, and a certain animal in a certain locality being compelled to use this plant, or that may prefer the change, may adopt the new form and become conformed to it as it evolves peculiar characteristics. Accidental preference for single parts of the plant, as the leaves, buds or tender shoots, or nuts, fruits, flowers, roots, bark, etc., leads to habitual employment of the parts and consequent modification of structure, both special and general.

It is not possible to name or describe one completely understood process in this intricate system, but these crude suggestions may direct observation of the principles at work. The subject is so massive, yet so new and unworked, that little can be expected of attempt at elaboration from this paper.

But we will close by reference to one animal upon which food-selection has wrought marked effects, and whose development has been largely influenced by it. I refer to *Homo sylvaticus* (man). With the appearance of the opposable thumb in man, the era of the teeth as prehensile organs began to decline, until to-day that function in them is entirely aborted. With the beginning of the artificial reduction of his food from its natural condition dates the great catalogue of changes in his organism, one of the most conspicuous and important of which is the reduction of the masticating region. The art of cooking his food came with intellectual evolution. The brain case increased as the face was suppressed, till to-day it greatly predominates in the contour of the head. The artificial reduction of food has induced a tendency toward the suppression of the teeth and their environments, and in the highest races we find a marked atrophy of this region. We claim that this is due to the softening of food, which has caused mastication to fall largely into disuse, and that the masticating organs not being employed, or being of no further use to the economy, must, according to law, submit to the doom of useless things, and be expelled. We thus contend that the teeth of man are tending toward final abortion on account of their chief function, mastication, rapidly becoming useless. Like all other organs, they require the stimulus of use to ensure their perpetuation in the species, and like all organs that have become useless through altered habits of the species, must be suppressed through the law of economy of growth. As evidence that the tendency is in progress, we may cite the atrophy of the masticating region in the highest races, as compared with its size and strength in the savage, *i. e.*, the smaller muscular development, jaw-bones, teeth, etc. Also in the wisdom-tooth we are the contemporary witnesses of an organ in process of suppression — a very remarkable and interesting phenomenon. This tooth in civilized man to-day is rarely perfect in size or structure; it is usually atrophied, often markedly so; is always inferior in structure to the other teeth in the same denture; is often erupted very late in life, and in some persons never appears; or again, only one or two in the set of four may erupt. This tooth, originally, as in most savage tribes to-day, was the peer of the other molars in quality and usefulness, but in civilized man it is frequently worse than useless on account of the disturbance it frefrequently occasions by mal-eruption.

The food of man is itself undergoing evolution, and the era of its scientific production is fast approaching. This is progressing at such a rate and with such a tendency, that its ultimate result will be the chemical preparation of the proximate elements of the tissues, which will be used as food alone. The resources of nature are beginning to be felt to be inadequate to meet the demands of the increasing millions of the race for food. Science must come to the rescue, and will produce from inorganic as well as organic nature the compact and simple proximate elements of the tissues, upon which, in the time to come, the race will doubtless depend for food. In this form food will require little manipulation preparatory to assimilation, and our species will have reached the highest pinnacle of life when possessing the least animality; and this chiefly by the power of food-selection!

EVIDENCE OF ANCIENT FORESTS IN CENTRAL KANSAS.

BY H. C. TOWNER, OF CLAY CENTRE.

In the spring of 1874, my attention was called to a specimen of fossil flora, a leaf of *Sassafras cretaceum*, from the sandstone ridge called the "Black Hills," a few miles west from our place. A fragment of *Phillites Vannouæ*, and several sprigs of *Glyptostrobus gracillimus*, were taken from the same stone which held the larger leaf. During the season of 1874, I was with Prof. Mudge, in the upper Cretaceous; but in the spring of 1875, began a series of explorations with a view of developing, so far as possible, the floral resources of this immediate region. This, with the limited time and means at my command, is a slow work, and hardly yet more than begun; yet, to the present time, I have worked with good success, having developed three different deposits of fossil leaves, numbered in the order of their discovery, and all lying in township 9, range 1, east, in Clay county. The three deposits lie within a radius of about a mile, at an elevation more than 1,500 feet above the sea level, and have already yielded the following genera:

Deciduous.—Sassafras, Aralia, Quercus, Menispermites, Platanus, Greviopsis, Magnolia, Salix, Populus, Todea, Alnus, Laurus, Liquidambar.

Evergreens.—Sequoia, Pinus, Glyptostrobus, Inolepis.

Palm Family.—Cycadites.

I have found these leaves in all shapes—some lying singly, flat and smooth upon the stony matrix, almost perfect; others torn and worn to the last degree, and almost illegible; many rolled up in clusters or concretions; one above another for a dozen thicknesses; and all giving evidence of having been deposited at the bottom of comparatively quiet, smooth waters, as it is only rarely that I find a small fragment bearing ripple-marks. As a matter of course, the substance of the leaf is gone, though in a number of instances I found the woody portion of the stem and large vein in good preservation, after its long sleep of over ten millions of years!

I observed one singular fact, which I find confirmed by Dr. Lesquereux, in his supplement to the "Report on the Cretaceous Flora," namely, that while the different varieties of ancient forest trees were more or less intermingled in all the deposits, still, as a general rule, each particular kind of tree had its own chosen locality, where they grew and flourished through long ages of luxuriant greenness, leading a life of untroubled enjoyment, if we can suppose the vegetable family to enjoy life. Following the rule I have mentioned, the three deposits may be designated as follows: No. 1, *Quercus;* No. 2, *Sassafras;* No. 3, *Aralia.* These three forms are not marked as the only, but as the prevailing, types of their respective localities.

The Sassafras appears to be by far the prevailing form. With its kindred type, Araliopsis, it occupies nearly all of the No. 2 deposit, and encroaches largely upon the others.

Associated with the deciduous trees we find the evergreens, the conifers represented mostly by their cones and small branches and twigs. In nearly every case, these remains are found *within* the enveloping matrix, and in nine cases out of ten, in the hard black stone, some of which is so charged with iron as to be proof against any common hammer. This last remark requires a little explanation. In the deposits that I have thus far examined, I have found beneath the surface layer of hard black stone a second layer of soft brown stone, all sand, the surface stratum being hardened mud.

The latest, and so far one of the most interesting discoveries, is that of a *Cycadites*, in reference to which Dr. Lesquereux writes:

"Now, we have as yet not seen any species of this genus in our Cretaceous. Species of *Cycas* and *Zamites* are abundant, especially in the Jurassic. They are seen also, less numerous, however, in the lowest Cretaceous, and very rarely in the upper and middle Cretaceous. Heer has described one species only from the upper Cretaceous of Greenland," etc.

This would seem to indicate that *Palms* may have formed part of the forest landscape of ancient central Kansas.

While these researches were being made in Clay county, Mr. Charles Sternberg, a most indefatigable explorer, has sent scores of fine specimens from Fort Harker. In former years Prof. Mudge has made most interesting discoveries on the Saline; and Dr. Lesquereux, in 1872, explored the Dakota group from southern Nebraska far into Kansas. The result of these explorations, thus far, has been to develop the fact, that far back in the dim ages of the forgotten past, there grew and flourished here in central Kansas vast forests, comprising most of the trees that now exist only in the temperate zones, with many others almost as exclusively tropical or semi-tropical; that these forests grew on long, low islands, in the midst of, or on the borders of, the great Cretaceous sea, which then rolled its heaving billows over all of what is now western Kansas. The presence of so many tropical and sub-tropical remains proves that a mild and equable climate obtained from the Gulf of Mexico to the arctic regions, as the fossil remains from the Cretaceous beds prove the existence of a warm, shallow sea.

In several places over the region I have explored, I have found impressions of wood and bark — hundreds of these *casts* stamped indelibly upon the now solid rock, the wood itself being very rarely preserved. Very few of these impressions of wood are ever found in the same deposit with the leaves, indicating, perhaps, that these fragments may have drifted to some distance from the spot whereon the trees grew. I have seen, in a few instances, rocks of hardened clay and sand, covered with sun-cracks, showing conditions analogous to those which now obtain along our own shores.

Thus, this long line of hills and bluffs now known as the "Dakota group" indicates an ancient shore-line, covered with heavy forests, enjoying a mild, even climate, animated and irradiated by the same sun, moon and stars that now cheer and enliven our landscapes; and, probably, the haunts of many of the monsters whose bones we find fossilized in the chalk and shale of the Cretaceous beds. We have yet, I think, no traces of feathered inhabitants of these primeval forests. No animals roamed beneath their silent shades. They lived, fulfilled their destiny, and passed away, leaving behind them imperishable records of their life and usefulness — literally, "Footprints on the sands of time."

THE RIVER BLUFFS.

BY PROF. JOHN D. PARKER, OF KANSAS CITY.

Chief among influences moulding a people are those derived from Nature. Like odors distilled from flowers, or colors playing in sunbeams, the subtle powers of Nature elude analysis. But as the crystal lake mirrors the landscape which environs it, so Nature is reflected in any people. In the mountains of Greece we find the greatest æsthetical development of the Old World. Italy with its sunshine and flowers, its brilliant skies and out-door life, developed an indolent but happy people. The canton sprang up amidst the eternal mountains and Alpine glaciers of Switzerland. England, with its comparatively immense shore-line, its fogs distilled from the Gulf stream, and its pastoral lands, developed a strong but phlegmatic race. The New England hills naturally moulded a people possessing the highest and best traits in man. Muscular development was required

to subdue Nature, intelligence evolved in developing and applying science to industry, culture was inwrought and polished manners ground out by the attrition of society, and art was engendered by the luxuries which Nature offers to those who hang over with delight and feast upon landscapes. During our civil strife, the love of liberty was found strongly intrenched in the mountainous districts of West Virginia, North Carolina and East Tennessee.

It is the purpose of this paper to inquire, What has Nature done for the higher development of the dwellers on the great central plains of the North American continent?

In wealth and variety of soil the great plains are justly celebrated. Nothing can exceed the depth and fertility of the alluvial deposits. The cereals of the temperate zone grow with almost spontaneity. The sacred plumbe has its counterpart, a thousand cattle on a hill. With mineral resources Nature has stored her secret chambers. The offerings of grains and fruits and flowers are in profusion. But what keeps a people living amidst such luxuries from indolence and retrogradation?

Among Nature's opposing forces may be placed bluffs, an American term applied to cliffs or high banks overhanging streams. The river bluffs constitute an important element in the physical features of the West. The Mississippi river and its numerous and powerful affluents nearly always flow between these bluffs, rising in places as massive walls and surging back sometimes for miles from the river to either side with decreasing inclinations, and melting away at last in the level prairie. Counting both banks, this system of rivers alone would give a single line of bluffs meandering through the great plains something like twenty thousand miles in length and rising at some points to a height above the river of five hundred feet.

The geology of the river bluffs unfolds itself on the following dynamic principles. In an open country like the prairies, rivers possess two elements—a channel and a flood-plain. During the winter season, and some months in summer, the stream is confined within the channel. But during freshets, and particularly the June freshet, which is swollen by mountain snows, the stream rises and spreads over the flood-plain. Now should the country in the catchment be elevated say a hundred feet by internal forces, the consequence would be that the river would have a greater fall, quicker flow, and more eroding power. A new channel and a new flood-plain would be cut back, if less wide, leaving the older margins of the old flood-plain as an elevated terrace. And the walls of the original geological surface, or other banks of the stream, would be left by the receding water to be succeeded by such successive epochs and river bluffs. And the gashings or ups of any surface of the original mass would be accomplished by the escaping steam or gases, or outward pressure of the cooling mass beneath, raising the land elevated above the surrounding prairie. Four such epochs of late Tertiary time since the rivers of the eastern portion of the continent began to flow, and three since the Mississippi began to pursue its course toward the Gulf. As the geological epochs have been greatest toward the interior and western portions of the continent, the eroding power of rivers has progressively increased, causing the river bluffs to become more prominent as you go westward. If the reader as we ascend the rivers, but as we shall see where they are located.

The *importance* of the river bluffs is an important element in those dwelling on the great plains. People always living among hills contrast with those living on the level in proportion of the winds in a given period. At Lawrence, Kansas, for example, I have observed as many as sixty-four hours in one day of unbroken wind, as recorded by the Professor of Meteorology of the University, during the month of March, 1879, including the following two. During the year 1877 the wind traveled [illegible] miles, which gives a mean daily velocity of over five miles and an hour [illegible] miles. These usual winds blowing uniformly over the whole year would give the people of Lawrence a constant current of air between a fresh breeze and a strong wind. On January 5, 1878, as

the same place, the wind attained a velocity of seventy-five miles an hour, a violent gale, only one remove from a hurricane.

The same general belts of wind, running east and west, prevail around the globe. But the forest-crowned hills of New England and the Middle States drive these currents up into the higher regions of the atmosphere. Now the river bluffs are the natural wind-breaks of the great central plains, and without them the prairies would be a bleak, an almost uninhabitable plateau.

Many have observed that rain storms follow streams, without understanding the principles involved. Streams saturate the contiguous air, which again yields its moisture to a condensation, which does not reduce the dryer air lying outside at a distance from the river to the dew-point. In a similar manner, a super-saturated sponge will give forth moisture to a pressure under which a partially saturated sponge would not yield a drop. A cool current of air passing over the country would thus cause the condensation of vapor, or the ever-forming rain cloud, to appear to travel along river courses. And the greater precipitation of moisture along river courses has been one essential element in the growth of forests, frequently covering river bluffs to give them more force as wind-breaks.

The *horticulture* of the river bluffs is worthy a passing thought. The pursuits of any people determine to some extent their character. Horticulture is a scientific pursuit involving mind, and possessing elevating tendencies. Now the river bluffs are the natural home of the horticulturist. The conditions of soil and climate determine this pursuit almost to the exclusion of cereals. The apple, pear, plum, peach, quince and apricot love the bluffs, and the small fruits flourish. Notably the grape finds its home among the bluffs. We see its rich purple clusters peeping out beneath leafy trellis bars up the sides of almost inaccessible heights. A horticultural people sandwiched in all through the great plains, and mingling freely with neighboring communities while discussing cognate topics, are not devoid of influence which tends to lift a people into higher forms of living. When the year comes to his prime and bears to our homes his rich stores, ripened with dew, sunshine and shower, we dream of Eden, the ideal of human earthly perfection.

The *æsthetics* of the river bluffs must not be neglected. The absence of this element is dangerous to any people. When painters cease to study Nature's habitudes, and galleries of art are neglected, when poets forget to draw from her their inspiration and repeat her voices, decay falls on a people. In the great plains almost the only elevations are found along the rivers. From these heights the prairies with their green carpets richly ornamented with flowers unfold before us. Nothing compares to a prairie scene except the mighty ocean. The blue vault hangs over us more cerulean than in Eastern climes, the river winds its silver thread between the bluffs until it seems to be broken, and the undulating prairie rolls all around us like the ocean. With such scenes ever before a people can there be decay in poetry, painting or sculpture?

The *home life* of the river bluffs is an essential element. Nearly all our Western cities and smaller towns, containing quite a proportion of the population, are found along the rivers, nestled in the bluffs. The luxury of hills is thus brought to our very doors. No one is in condition to enjoy this luxury until deprived of it. When hills are piled on hills, as in some of the States, there is too much of a good thing. Desserts of rich food eaten daintily become a luxury. River bluffs are the desserts of our broad prairies, with which Nature has stored her ample board. The prairies satisfy our physical wants; the bluffs feast our souls. The prairies pour in their ample products until all our store-houses are filled beyond measure. The bluffs lift up our homes and spread the board with ambrosial food. Lifted above the earth we live nearer the gods. We drink in the royal landscape around us, of which poets and painters may only dream. The luxury of a prairie home nestled in the bluffs cannot be portrayed.

At the mouth of the Kansas river, Nature evidently planned a city. From this point

the railway system naturally radiates. But the frowning bluffs seem to forbid it. G ually the bluffs melt away to fill the deep ravines. Easily-graded streets leave ter on either side, to be the sites of comfortable homes, while the crests, with finer view crowned with mansions. We love homes lifted a little above the busy street on ter heights, surrounded with fountains and trees, fruits and flowers. Such homes are l built all along the Father of Waters—rural retreats of luxury, taste and culture.

To the great central plains of North America, the river bluffs are Nature's ri gift. For ages Nature was slowly moulding them, and setting them as watch-t through all the land. They shield man from the elements which, unobstructed, w desolate his home; they furnish the conditions of a higher rural life; they disclose minerals, which Nature has stored in her secret chambers; they reveal the beaut Nature hidden in landscapes; they furnish sites for homes of comfort and luxury; tend to lift a people, in a word, out of a dead level, giving the power of elevation which flows intelligence, culture, and true refinement; they open a fountain of l waters to slake the thirst of coming millions. The gods dwelt in Mount Olympu are told, in the olden time; so here diviner forms seem to descend to dispense to their richest favors. Here are the lines of light that shall grow brighter and bro we trust, until the whole land shall be enlightened and filled with true knowledge. shall the graces descend into human habitations, filled with sunshine and gladness, as as rivers flow murmuring to the sea.

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